RAILROAD GAZETTE

FRIDAY, OCT. 2.

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Contributions.

It Might Be Worse.

WOLF CREEK, Mont., Aug. 21, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I send a sketch of a mile post on the Northern Pacific at a small station called Ravalli. The post is intended to show that Ravalli is 136 miles from the town of Hope and 162 miles from Helena. Some miscreant person of a facetious turn of mind has, with a soft pencil, transformed the period in the abbreviation of Helena into an L, and the sign now reads as shown. At the time I made the sketch I heard a man say that "Ravalli is a desolate place, but the inhabitants have the consolation, anyhow, of knowing that they are 26 miles nearer to Hope than they are to Hell."

M. J. LORRAINE.

The Reading Fast Engines.

The Philadelphia & Reading Railroad Co.
READING, Pa., Sept. 29, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Sept. 25, I notice under the caption "Locomotives for Fast Runs" that you make the outside lap of valve 1⅛ in. on our D33 engine that recently made the fast run—this lap should have been 1¼ in. I inclose a print of relative port opening and lead for various points of cut off on this same class of engine, which may be of interest to you in comparative examinations of different valve gears.

SAMUEL F. PRINCE, JR., *Mechanical Engineer.*

FORWARD MOTION.

Front End.			*Back End.*		
Cut off.	Port opening.	Lead.	Cut off.	Port opening.	Lead.
Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
4	1 1/16	1/16	4	1 1/16	1/16
6	1 5/16	1/16	6	1 5/16	1/16
8	1 11/16	1/16	8	1 11/16	1/16
10	1 15/16	1/16	10	1 15/16	1/16
11	2 1/16	scant.	11	2 1/16	scant.
12	2 3/16	3/16	12	2 3/16	3/16
14	1 5/16	1/16	14	1 5/16	1/16
16	1 7/16	1/16	16	1 7/16	1/16
18	1 9/16	1/16	18	1 9/16	1/16
19⅜	2 1/16	1/16	19⅜	2 1/16	1/16
	scant.			scant.	

Precautions Against Forgetting Train Orders.

Chicago, Burlington & Northern Railroad Co.,
General Superintendent's Office,
ST. PAUL, Minn., Sept. 23, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I notice in your paper of Sept. 18 an item in regard to conductors [on the Denver & Rio Grande] reading their train orders to one brakeman and engineers reading them to firemen. I put this rule in force on our line some three years ago, and am glad to see that some other line thinks it a good one.

JNO. R. HASTINGS.

[Other roads have also practiced this rule for a number of years. The Fitchburg was, we believe, one of the first to do it. We printed the Denver & Rio Grande rule to call attention to its style and phraseology. We should like the opinions of superintendents who have used this rule as to whether it should be mandatory or permissive. If the latter form is used the outcome may be similar to that with the rule requiring firemen to observe fixed signals whenever they can do so as well as not. In every collision resulting from failure to heed a signal the evidence shows that the fireman, just at that moment, was exceedingly busy with other duties. The fire was in danger of going out if it did not have a shovelful of coal instantly.—EDITOR RAILROAD GAZETTE.]

A Philosopher on Cattle Guards.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Sept. 11 there appeared an editorial note referring to a communication of Mr. M. K. King, General Manager of the N. & S. R. R., which would leave the inference that the National surface, saw tooth cattle guard was a very effective device, but of questionable humanity. This impression is predicated upon the fact that the animal attempting to cross the cattle guard would experience pain from the projecting iron points which are designed to serve that very purpose.

In her wise economy, Nature inflicts pain as a deterrant to activities or movements which are attended with pain, and such pains serve as warnings to the person or members threatened. The hand or any portion of the body immediately experiences excruciating pains when in contact with fire and the exposed member is automatically withdrawn; were it not for the pains the hand would be destroyed without warning to those in danger.

There is no form of obstacle that an animal in search of food will not overcome, let it be fence, ditch or cattle guard. The fence affords a direct obstruction to the body, but gives little security against animals that learn to jump. The ditch and cattle guard are designed to offer difficulties of footing. Animals, like men, are careful in trusting themselves to unfamiliar constructions which they do not understand. It is a mistake to suppose that the animal blunders over a cattle guard without first investigating and testing it. For this very reason most any form of guard is found effective for a short time until, indeed, the features of the guard are sufficiently understood to enable them to cross it. There is no danger of the animal rushing headlong into the guard, but he will study and test it at his leisure. It is noted that cattle sooner learn the weak points of a guard on lines of infrequent trains than on lines of heavy traffic for the very reason that they are not so often disturbed.

Now natural law at once suggests a form of guard which will offer pain to the inquisitive animal which seeks to overcome the obstacle placed in the way of its passage, and true humanity rests in the fact that the pain experienced in successive attempts eventually makes the very appearance of the guard deterrent, and preserves the animal from the dangers of the track, no less than the train from possible derailment.

It is doubtful if even pain or any form of construction could prevent an attempt of a famished animal to cross in order to secure food, and the perfect guard is one which will never permit of the animal being caught and lodged in the contrivance, to its own destruction, and danger to the train which strikes it. This last is one of the worst features of the covered pit guard, independent of its constructive defects. 'Tis true that famished animals are seldom exposed to such temptations, nevertheless, when they are, it is an absolute essential that all danger to trains shall be reduced to a minimum.

BENJAMIN REECE, M. Am. Soc. C. E.,
Consulting Engineer National Surface Guard Co.

Charles Dickens on the Life of a Locomotive.

In our issue of Dec. 3, 1886, we published a letter from "Charles Dickens" (Engine No. 955, London & Northwestern) telling something of his autobiography up to that time. Week before last we published the main facts given in the letter below, but none of the details.

Sept. 12, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Some hitherto unpublished correspondence of Dickens having been recently given to the world, and more being in request, I have thought the public, especially of Manchester, and those engaged in the mechanical engineering profession, would regard as opportune and otherwise appreciate a further contribution of the kind direct from myself.

It will be remembered from my already published correspondence how I was turned out of the Crewe Works on Feb. 6, 1882, sent to Longsight to run as often as I could between Manchester and London, as a minimum day's work, in charge of David Pennington and Leigh Bowden, taking the 7.45 a. m. train out of Manchester, and returning with the 4 o'clock out of London, and was so regularly on the road, in fair weather and foul, in snow and rain, that by Sept. 7, 1886, when my performance had just exceeded half a million of miles, the friends I had so often carried safely had christened the trains I worked the "Charles Dickens," and had ceased mentioning the times of departure when making their traveling arrangements.

On March 17, 1886, I lost my faithful groom, David Pennington, through his eyesight being unfortunately injured; but Josiah Mills, who succeeded him, together with his mate, Leigh Bowden, who has been with me from the commencement of my career, have been so attentive to my various daily wants that to-day, when about half way between Mow Cop and Harecastle, on my 2,651st trip to London and back, I accomplished the, so far as I know, unparalleled feat, on either this or the other side of the Atlantic, of running 1,000,000 miles in nine years and 219 days. In addition to the 2,650 trips to London and back, I had run 92 other trips, consuming 12,515 tons of coal and evaporating 93,237 tons of water. Although it may seem more extraordinary than my athletic achievement, through the effective arrangements of my designer, and the convenient interchangeable system peculiar to the Crewe creations, I have had two new digestive organs supplied to me since my birth, but such has been the quality of the food and medicine received throughout that neither these nor the original are yet worn out, in fact the first was in such excellent condition that after I laid them aside my sister "Snowden" traveled 191,236 miles with them, "Balmoral" afterward appropriating them, and still running with them. "Courier" became enamored with my second, and is making a good record therewith. My third will, I hope, raise the steam for me for many a day to come; and I myself trust to witness, with many old acquaintances, the dawn of the 20th century, although whether my constitution will hold good for another million of miles remains to be seen. At present I feel no symptoms of decay; all my energies are unimpaired, and by the kind indulgence of my master, I and my grooms are just off to enjoy a week's holiday during the gloriously fine weather now prevailing.

"CHARLES DICKENS" Engine No. 955).

I have no objection to this further letter from "Charles Dickens" being published. The statements made are correct. F. W. WEBB, *Chief Mechanical Engineer,*
L. & N. W. Ry., Crewe.

The Jersey City Trainshed of the Pennsylvania Railroad.

[WITH AN INSET.]

The new iron trainshed of the Pennsylvania Railroad in Jersey City which is now nearly completed is the largest in this country and we believe in the world It stands at the terminus of the four-track elevated railroad which has recently been built through the streets of the city from the Bergen cut, and which was illustrated in the *Railroad Gazette*, Dec. 12, 1890. The plan of the yard and the signaling have also been described and illustrated by us quite recently.

The principal dimensions of the structure are:

Length centre to centre of end trusses	652 ft. 6 in.
Length of roof over all	653 ft. 6 in.
Span centre to centre of foot pins	252 ft. 8 in.
Height centre of foot pin to centre of crown pin	90 ft.
Height of span in the clear above rails	86 ft. 6 in.
Span out to out of trusses	256 ft.
Height of lantern above foot pin	115 ft. 8 in.

The materials used in the superstructure were:

Iron	2,277 net tons.
Sheet tin for roofing	128,000 sq. ft.
Glass	78,000 sq. ft.
Wire netting	80,000 sq. ft.
Corrugated iron sheathing	43,000 sq. ft.

As a basis for calculating the dimensions and disposition of the iron work, these conditions and requirements were assumed:

The weight of the iron work was placed at 16 lbs. per square foot of ground plan, the weight of the covering at 13 lbs. per sq. ft. of roof surface, the snow weight was assumed at 17 lbs. per sq. ft. of ground plan, and the horizontal wind pressure at 35 lbs. per sq. ft. of elevation. Then in calculating the strains the following cases of loading were considered: (1) Dead load over all; (2) snow on one side only—unloaded side; (3) snow on one side only—loaded side; (4) snow all over; (5) snow on twelve centre panels only; (6) wind—loaded side; 7) wind—unloaded side; (8) additions to strains from 15 ft. ventilator—loaded side; (9) ditto—unloaded side. The further consideration of the wind blowing to and from the anchored side of the span was also taken into account. Then was added the limit of strain to be imposed upon the material which was placed, for dead load and wind, or dead load and snow combined, at 14,000 lbs. per sq. in. of tension, and for dead load, wind and snow combined, at 18,000 lbs. per sq. in. of tension. The formula for compression in the first instance was

$$\frac{14{,}000}{1 + \frac{l^2}{15{,}000\ r^2}} \text{ per sq. in.}$$

and, in the second case,

$$\frac{18{,}000}{1 + \frac{l^2}{10{,}000\ r^2}} \text{ per sq. in.}$$

where

l = strains from live load in pounds.
r = least radius of gyrations inches.

In addition to this general basis the end trusses were considered relative to the special loads which they would be called upon to carry. Its own weight was assumed to be the same as for the intermediate trusses, and 12 ft. 3 in. of purlins, &c., both together assumed as five-sixths of the weight of iron work carried by intermediate truss; (2) the glass and end framing were placed at 3½ lbs. per sq. ft.; (3) one-half of the horizontal wind truss = ½ × 240 = 120 lbs. per lineal foot horizontal; (4) one-half of the inside gallery = ½ × 260 = 130 lbs. per horizontal lineal foot; (5) vertical truss and tie-rod = 100 lbs. per horizontal lineal foot; (6) outside gallery @ 150 lbs. per lineal foot = four-thirds × 150 = 200 lbs. per lineal foot horizontal; (7) one-half of vertical bracing = ½ × 80 = 40 lbs. per lineal foot vertical; (8) horizontal wind pressure, weight of snow covering the same as already specified.

With this general explanation of the problem as it was presented to the engineers, we may now turn to the methods employed in the execution of the work, which was done by the Pencoyd Bridge & Construction Co., of Philadelphia, Pa., for whom Mr. C. C. Schneider is chief engineer. The building stands 50 ft. north of and parallel with the street line of Exchange Place in Jersey City. The east end is about 25 ft. horizontally west of the present water line of the Hudson River. The ground upon which it stands has undoubtedly been filled in to a certain extent, but the filling was done so many years ago that it is practically in the same condition as original

soil. The surface soil is, however, so soft that it is entirely unsuited for the support of heavy structures, hence piles were resorted to.

South of the trainshed is the office building for the Jersey City offices of the company, which will be described in detail later on. It is merely mentioned here because its north foundation wall is the retaining wall for the buttresses carrying the south ends of the main russes of the shed.

sheathed with corrugated iron for the whole length. Above this point the sheathing is omitted in the panels between the trusses where pivoted windows are placed and is resumed the whole length in the top panels (fig. 5.)

At *B B* (fig. 3) there are diagonal braces extending out on either side of the double truss as shown in fig. 6. At *A A* (fig. 3) the diagonal bracing between the trusses is identical with that shown at *B B* (fig. 6).

Fig. 7 gives a cross section of joint No. 22 where the di-

Fig. 15—Traveler Used in Erecting the Jersey City Trainshed—P. R. R.

As the foundation wall is lower at the west than at the east end the piles were driven somewhat closer together. The wall is built upon three rows of piles spaced 3 ft. 7 in. from centre of the outside rows at the east end and 4 ft. at the west end. They were driven down to a hard bottom, which is probably rock, in all cases, and their length varied from 21 ft. to 42 ft., increasing toward the river front. All piles were required to be at least 12 in. in diameter at the butt, and most of those used ran considerably above these dimensions. They were sawn off 3 ft. 6 in. below high water mark and capped with 12 in. × 12 in. yellow pine. On this a flooring of 12 in. × 12 in. yellow pine was placed, upon which, in turn, the rubble masonry for the foundation was laid. This masonry was built in accordance with the drawings for the piers and retaining wall, (figs. 1 and 2), and with a slight downward inclination of the capstones toward the west, the variation in height between the east and west end of the building being 2 ft. 5¼ in. On the north side no retaining wall was used, as the land close to the structure has been filled in and will be used as a yard with tracks on a level with those in the shed. The pile driving and mason work for these north piers is identical with that already described as relating to the south buttresses and retaining wall, except that the piles were driven in clusters of 16 for each pier, while only 12 were used under the buttresses. It may be remarked here that all of the mason work, as well as other mechanical details, was executed in accordance with the well known standard specifications of the Pennsylvania Railroad. This applies to the carpenter work, brick work, plastering, &c., of the office building also.

The great feature of interest in the structure is, of course, the span truss whose duty it is to carry the roof and withstand the strains imposed upon it by wind and snow. Our illustration (fig. 3) clearly shows the construction. It will be seen that the truss is of the lattice type, is anchored securely to the buttresses along the south side of the building and stands on rollers on the piers at the north side. Each truss is further held together by a line of 12-in. I-beams (figs. 3 and 4), weighing 100 lbs. to the yard, which pass below the tracks and prevent any spreading that would otherwise take place. The crown of the span is capped by a lantern 20 ft. 11 in. high.

As we have already said, the base of the truss is securely bolted to the capstone of the buttresses on the south side by heavy bolts, two bolts, 2 in. diameter and 8 ft. 6 in. long under square heads with hexagon nuts, being used for each truss. On the north side the foot rests upon eight steel rollers each 3 in. diameter and 2 ft. long, grooved at the centre for retention in place. These rollers in turn rest on a wrought iron plate bolted to the capstone. The detail of the foot of the roller bearing is very clearly shown by the engraving (figs. 4, 19 and 20). The anchored foot is similar in every respect.

From the base to the line *B B* (fig. 3) the building is

agonal bracing is composed of tension rods adjusted by right and left threads, which system obtains at every panel joint between this and the crown. This same fig. 7 gives the construction and size of the lattice purline plates, which is also carried out to the crown.

Fig. 8 is a detail of the riveting at the joint *L* 22 and fig. 9 of the joint *U* 22. The latter also gives a detail of the method of constructing the eaves trough, water spout, the rafters and roof boards. The span was necessarily erected in sections and the joint 22 is the end of the lower section or haunch. The next section as it came from the works ran to and included the joint 18.

Fig. 10 shows the joint and detail of the riveting at *U* 18. It also shows the construction of the foot of the ventilator and marks the point where the tin roofing ends and the glass skylight commences. All of the upper joints at panel ends are identical with this up to the centre, with the exception of sizes of iron and the work above the top chord.

Fig. 11 is the joint at *L* 18, and is typical of and identical with all joints on the lower chord at panel ends from *L* 22 to the centre, except for variations in the size of iron.

The next section extended to and included joint 14; the next two but not inclusive of joint 8. On this section the skylight ended at joint 12. The final section ran to the centre of the building, the middle joint being shown by fig. 12.

Fig. 18 shows the construction of the monitor roof, and gives the dimensions of the iron used in the uprights and diagonals as well as in the panels of the main truss down to joint 4 from the centre.

The upper chord of the main truss is built up of two angle irons 6 in. × 6 in. × $\frac{9}{16}$ in. and one plate 6 in. × ½ in., reaching from joint 22 to the centre. The lower chord consists of a web of 12 in. × ½ in. iron, two angles 3½ in. × 5 in. × ½ in. From the centre to joint 10 there is one covering plate on the lower chord 12 in. × ⅝ in.; at joint 10 a second covering plate of the same size is added, which reaches, with the first, to the foot of the truss. From joint 20 to joint *A A* (fig. 3) there is a third covering plate 12 in. × ½ in., added for curvature.

The diagonals of the panels from the centre to joint 4 are shown with their sizes in fig. 18.

The following tables give the sizes of diagonals and verticals in the panels and at the joints from joint 4 to joint 22.

DIAGONALS.

Panels 4 to 12	1 angle	4 in. ×	4 in. ×	⅜ in.
" 12 " 14	1 "	5 in. ×	4 in. ×	⅜ in.
" 14 " 18	1 "	5 in. ×	5 in. ×	⅝ in.
" 18 " 20	1 "	5 in. ×	5 in. ×	⅞ in.
" 20 " 22	1 "	5 in. ×	6 in. ×	⅝ in.

VERTICALS.

Joints 6, 8 and 10	2 angles	3½ in. ×	3 in. ×	⅝ in.
" 12, 14 and 16	2 "	4 in. ×	3 in. ×	⅞ in.
" 18 and 20	2 "	5 in. ×	3½ in. ×	⅞ in.
" 22	4 "	5 in. ×	3½ in. ×	⅞ in.
1 plate	8 in. ×	½ in.		

We have already called attention to the additional strains sustained by the end trusses over the intermediate, by the wind pressures acting against the end of the building. As will be seen by reference to fig. 3, the end of the structure is closed by glass and corrugated iron down to a point 26 ft. 6¾ in. above the top of the rail. This represents an area of nearly 12,000 sq. ft., which, when subjected to a wind pressure of 35 lbs. per sq. ft., brings a strain against the end truss of 420,000 lbs. The strain thus engendered is carried by a horizontal wind truss, fig. 3, from which rise the vertical wind trusses fig. 13, which rise to every panel joint in the main truss.

The line followed by the horizontal truss is horizontally across the end of the building till it strikes the main truss at the joint *L* 20, marked *a* on fig. 3; it then turns down and follows the line of the lower chord to *L* 22, marked *b* on fig. 3, when it again turns to the horizontal line and follows the joint to the outside of the truss. It is impossible to see exactly how this runs from an examination of the drawings, which we reproduce, as the diagonal from *L* 20 to *L* 22 is necessarily foreshortened, no matter in what way it is looked at.

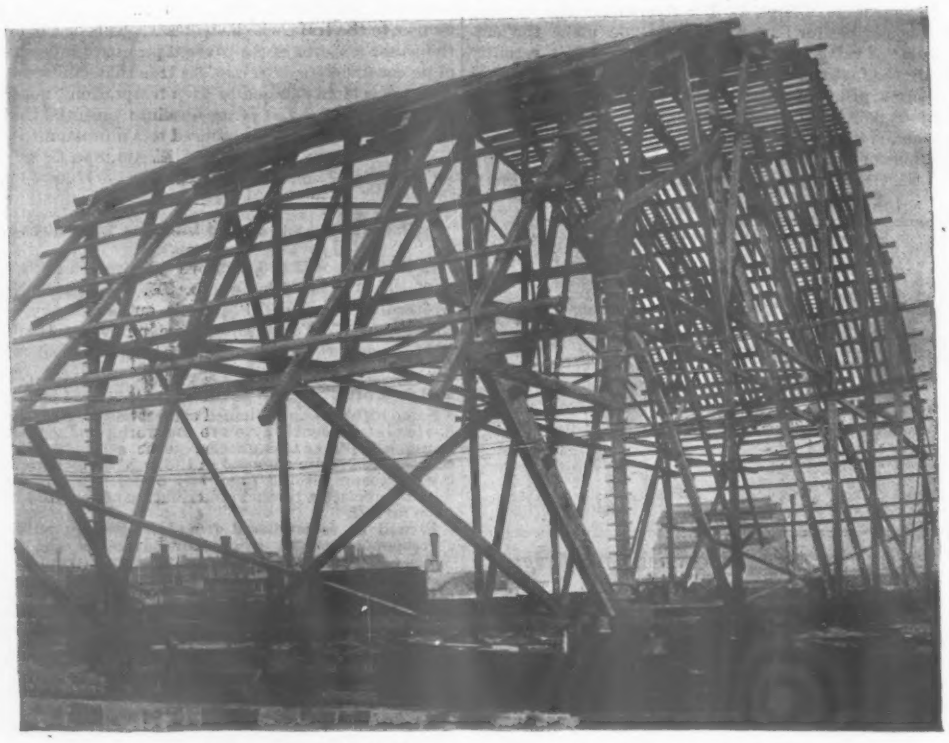


Fig. 16—Traveler Used in Erecting the Jersey City Trainshed—P. R. R.

We now come to the erection of the building. As will be seen by reference to the side elevation and plan, figs. 5 and 14, the trusses are erected in pairs, spaced 14 ft. 6 in. from centre to centre, and separated by a space of 43 ft. 6 in. from centre to centre of adjacent trusses. This places each pair of the 24 trusses on a firm and independent base and permits of strong cross bracing being put up between them. The contract for the erection was taken by Andrew Brann

of Philadelphia. The work of placing the spans in position was done by means of a traveling falsework carried on five lines of rails. The tracks were of the standard gauge and the falsework was built upon ten ordinary freight car trucks for cars of 60,000 lbs. capacity. The trucks were separated about 56 ft. between centres and a heavy stringer placed upon them. On this uprights were placed forming a bent, and extending to within a few feet of the proposed position of the lower chord of the truss. The caps of the bents carried a heavy flooring which constituted the crown of the falsework from which the truss sections were wedged up into an accurate position.

The structure was long enough to carry three trusses. The work was apparently very simple in erection. After the trusses covering the false work were in position the wedges were knocked out and the trucks pulled along into proper position for the continuance of the work.

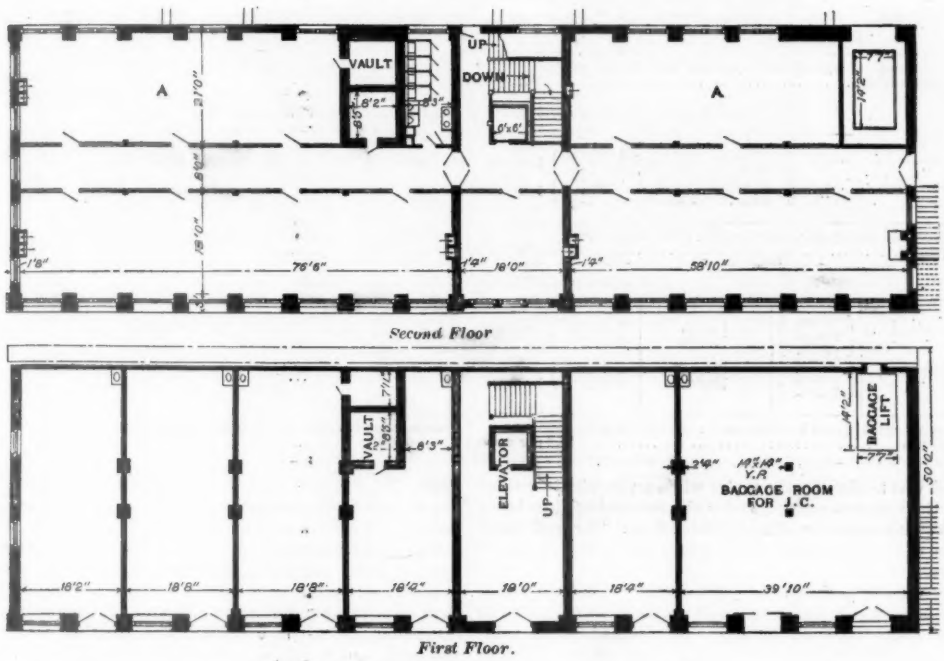


Fig 17.—Plan of Office Building, Pennsylvania R. R.

Figs. 15 and 16 show the general construction of the falsework.

Besides the train shed, and closely connected with it, there has been built an office building 50 ft. by 159 ft. 4 in. outside of walls. It is of brick, and stands between the shed and Exchange Place. Its north wall rests upon the retaining wall of the south buttresses of the shed, while a special foundation, similar in every respect to the retaining wall, except that it is lighter, has been built for the other three walls. The south wall of the building is buttressed to the roof, and the foundation is enlarged every 9 ft. 8 in. to carry the extra thickness of wall. At these points three rows of piles are driven 3 ft. between outside centres, forming a square. Between the buttresses the foundation wall is 2 ft. 6 in. thick on the flooring of the piles, and narrows to 2 ft. at the granite sills. Like the other walls, it is built of rubble masonry. The walls on the north side are 16 in. thick, and on the south the same between buttresses.

The building is five stories in height, and is divided as shown in the plans, fig. 17. The third, fourth and fifth floors are divided like the second (fig. 17), except that the rooms marked *A* are divided in two by a light well 19ft. 4 in. wide. Our plan merely shows the arrangement of the walls, as the distribution of the office space has not yet been decided upon or the partitions erected.

The heights of the several floors between tops of joists are as follows: First, 14 ft. 11⅝ in.; second, 13 ft.; third, 12 ft. 6 in.; fourth, 12 ft.; fifth, 11 ft. 6 in.

The top of the rubble masonry is capped by a granite sill, and the ground floor is of concrete. Above the granite sill there are two courses of Newark brown sandstone, upon which the brickwork is laid. Above the windows of the first floor there is a course of red terra cotta, as well as a cornice of the same material secured to the wall with iron straps.

The floors are laid on 3-in. × 9-in. hemlock joists, spaced 16 in. between centres, and carried on iron girders set in the brickwork at the outside of the building, and resting on 12-in. × 12-in. posts, running up on either side of the hallway, as shown in second floor plan, fig. 17, starting from the floor line of the second story, where they stand upon brick piers. The window sills are of Indiana limestone. Red brick is used for facing, except on portions of the north and east sides. Here cream brick is used below the top line of the windows of the fourth floor, where the train shed roof strikes the building, and below the sills of the same story windows on the east side down to the floor line of the second story. The three lower floors are to be finished in chestnut, and the two upper ones in white pine; all natural finish.

As the tracks of the sheds are 18 ft. above high water line and 13 ft. above the level of the dock, waiting room and street, some means of elevating baggage must be provided.

For this purpose a very complete hydraulic plant has been installed. Under the northeast end of the trainshed platform there is a boiler with steam feed pump injector, heater, etc., as shown on the plan fig. 14. The main hydraulic pump is of the Worthington make with steam cylinders 17 in. diameter, water cylinders 7¾ in. diameter, and a stroke of 15 in. This pump delivers water into the accumulator under a pressure of 300 lbs. to the sq. in., whence it is carried to the baggage lifts at the east end of the platform and in the baggage room and also to the cylinder of the passenger elevator in the office building.

The baggage lifts are located, two at the east end of the trainshed, fig. 14, and one in the baggage room of the office building, fig. 17. They are of the direct acting lift type, and have a platform area of 8 ft. 10 in. by 22 ft. 3 in. in the shed and 7 ft. 7 in. by 14 ft. 2 in. in the baggage room. The capacity of the latter is about 4,000 lbs., and of the former about 6,000 lbs. The office elevator is of the ordinary type, with cylinder having multiplying drums.

Referring again to the plan fig. 14, we see that there are 12 parallel tracks running the length of the shed, separated by walks for the accommodation of passengers and baggage trucks. At present these walks are of wood, but as soon as the filling is thoroughly settled they will be relaid with granolithic pavement and the tracks ballasted with broken stone. The tracks end about 25 ft. from the east end of the building, across which there is a broad walk, as shown in the plan, fig. 14.

In regular service it is intended that the five tracks on the south side shall be used for incoming trains, and the seven to the north for outgoing. The connections west of the shed, however, are so arranged that in case of a derailment or blockade any track may be used for either service, as desired. The following table gives a comparison of the scheduled daily train service in some of the principal depots of the East:

Railroad.	Location.	No. trains.	No. movements in signal tower.	No. m'vements per train.
N. Y. C. & H. R. R.	Grand Central Depot, N. Y.	451	2,400	5.32
Penna. R. R.	Broad st., Philadelphia	424	1,724*	4.06
Central of N. J.	Jersey City	296	867	3.25
Erie.	Jersey City	218	.....	....
Penna. R. R.	Jersey City	243	2,240†	9.22

* All in-bound engines cut loose and fly trains in.
† Includes about 160 turntable movements.

In the above table the number of trains is merely that of loaded trains and does not include the hauling out or, handling of empty trains by shifting engines.

Among the special conveniences in the shed may be mentioned the gas and water cocks that are located alongside of each track. There is a gas cock every 50 ft. and a water cock every 100 ft. for each track. At night the shed is lighted by 64 arc lights, which receive their current from the central station owned and operated by the company.

Considered as a whole this new trainshed may be regarded as one of the finest specimens of arched roofs in the world, and is, as far as we have been able to ascertain, the largest single span structure in existence. The following is a list of a few notable structures with their span: Pennsylvania Railroad Trainshed, Jersey City, N. J., 252 ft. 8 in. span. St. Pancreas Station, London, Eng., 243 ft. span. Grand Central Depot, New York, 200 ft. Union Pass. Depot, Frankfort, Germany, 3 spans of 183 ft. each. Alexander Place, Berlin, Germany, 123 ft. span.

Notes on the New York Street Railroad Convention.

The ninth annual convention of the Street Railway Association of the State of New York was held at the Hotel Metropole, New York City, week before last. Representatives of about 30 street railroads were present.

The president urged that as much time as possible of the convention should be devoted to the subject of improved motive power, and called attention to the fact that the past year had been one of prosperity in the street railroad companies of the State of New York. It has been comparatively free from snow storms and from epidemics among horses, and the receipts show a good increase. There has been little adverse legislation, and but few labor disturbances, owing, probably, to the basis of the conditions under which street railroad labor is employed, which has been the outcome of the troubles in the past few years. Benefits will accrue to street railroads by reason of the decision of the Court of Appeals, which provides the manner in which assessors shall treat the capital stock of corporations. It holds that corporations deriving profit from capital stock shall only be assessed on the par value thereof, and that surplus earnings shall be exempt from assessment to the extent of 10% of the capital of corporations.

The report of the Executive Committee has an interteresting paragraph on motive power, the substance of which follows: The horse is with us, and always will be in greater or less numbers, but we devoutly hope that his days are numbered. Cable power is having its full share of attention, as is evidenced by the transformation into cable roads of the lines on the two leading business thoroughfares of the metropolis. This association in its meeting this year, as in that of a year ago, has one main object, the consideration of electricity as a motive power. While such companies as the Third Avenue and the Broadway and Seventh Avenue demonstrate the courage of their convictions by launching out upon an expenditure of millions, most of us must make haste slowly; and we, therefore, turn our attention to electricity. The people want an improved motive power, *i. e.*, an improvement over horses; and surely the most promising motive power, based upon what we see and hear, is electricity.

Mr. John N. Beckley, president of the Rochester Street Railroad Co., presented a paper on electric motive power. The following are quotations which are of especial interest:

It was soon found that while cable railroads answered the purpose for which they were designed in cities like Chicago, Philadelphia and New York, they would not do in smaller cities, except in isolated cases where vast numbers of people would require to be moved daily over a comparatively short mileage. Five years ago the only street surface railroads which were in successful operation anywhere in the United States were horse and cable railroads. Within that five years more than 4,000 street cars have been electrically equipped. Nearly 500 cities in this country have street railroad systems in operation, and as many as 3,000,000,000 of people are carred annually, or 50 times the entire population of the United States. Think of the daily loss to the people of any city where horse cars are run from four to six miles an hour, when it is possible to use electric or cable cars running from six to twelve miles an hour. The operation of street surface railroads by electric power has passed beyond the experimental stage, but we hear occasional fears expressed that the direct systems will be wiped out by the introduction of a commercially successful storage battery. We find in some communities so great a prejudice against overhead wires that railroad companies are unable to obtain the necessary franchises and privileges for establishing electric roads; but the trolley has come, and come to stay. There is an advantage with electric cars in crowded streets which is hardly appreciated by those unfamiliar with them. During the time of a recent celebration cars propelled by electricity passed through an immense concourse of people without the slightest accident. They were moving as slowly as desired and backing up where necessary by a reversal of the current. Cars drawn by horses could not have passed through the immense crowd with safety, and cable cars cannot back up.

Mr. Beckley advocates the trolley system for the streets of New York City in this report, but his argument is not conclusive. To show the necessity for using overhead wires, he states that experience has shown that unless poles be set and wires strung electric roads cannot be made a commercial success, and therefore without poles and wires electric railroads will not be operated.

Regarding the cost of operation, Mr. Beckley states that everybody knows it costs less to construct and equip a horse railroad on a given line than an electric railroad, and that it costs very much more to construct and equip a cable than an electric railroad. In changing a horse railroad to an electric railroad, it is safe to say that the least increase in gross receipts will be 15% and the average probably 30%. Those who proposed to substitute electricity for horse power will make a great blunder if they attempt to put in cheap construction or material. The rails should be of T section not less than 50 lbs to the yard, if of girder section. The weakest place in the track is, of course, at the joint, and no cheap contrivance at that point should on any account be permitted. With the girder or T-rail construction, it is a useless expense to lay a continuous supplementary wire. The rail should be well and heavily bonded at the joints with iron and cross connections between rails should be frequently made.

He is convinced that much we have heard about the inefficiency of generators and motors is due to trying to get too great a quanity of current through too small a quantity of copper. In the power stations do not make the power units (engine) too large. Accidents will happen as long as machinery is run, and an accident to a 500 H. P. plant is serious, while the cars or most of them can be kept moving if one of two or three small engines (units) break down. The same rule, of course, holds as to generators. Always put in a condensing steam plant and locate a power station near the centre of the system, but above all, if possible, on a stream large enough to

furnish the water for boilers and condensers. City water is expensive.

It is a mistake to equipa car body to a greater length than 18 ft., and we think a 16 ft. car is better still. During the hours of the day when travel is heavy, it is easy to pull a trailer. Much difficulty has been experienced with motors, the chief reason being that they have been too light mechanically and too economical electrically to stand the strain. This has taught a lesson to electric companies, which has resulted in advisable changes. The scrap heap about an electric car storage house often tells a significant story.

The officers elected for the coming year are, *President*, John N. Beckley, Rochester. *Secretary* and *Treasurer*, W. J. Richardson, Brooklyn. The Executive Committee consists of the President and Secretary, and Daniel F. Lewis, Brooklyn; C. D. Wyman, New York City, and Charles Cleminshaw, Troy.

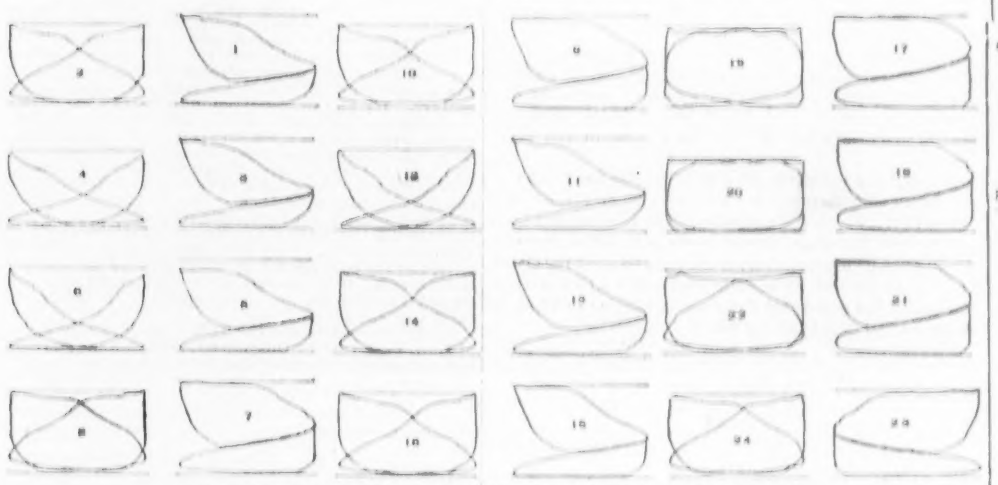
Comparative Tests of a Compound and Simple Locomotive on the Western New York & Pennsylvania.

Mr. A. Vail, General Master Mechanic of the Western New York & Pennsylvania Railroad, has been for some time past making an extensive series of tests for the object of comparing two locomotives; one the ordinary ten-wheel type, and the other the Baldwin compound, identical in every way except in the compound feature. The locomotives were built at the same time by the Baldwin Locomotive Works, and were in identically the same condition when tested. The following are the dimensions of the engines:

DIMENSIONS OF ENGINES.

	Compound		Standard.
	High Press.	Low Press.	
Diameter of cylinders	15 in.	21 in.	19 in.
Stroke	26 in.	26 in.	26 in.
Lead	1/4 in.	3/8 in.	1/4 in.
Outside lap	1 in.	1 in.	1 in.
Steam port, length	21 3/4 in.		16 in.
" " width	1 1/2 in.		1 3/8 in.
Exhaust port, length	21 3/4 in.		16 in.
" " width	2 in.		2 3/4 in.
Bridge	1 in.		1 in.
Throw of eccentric	5 in.		5 5/8 in.
Valve travel	5 in.		5 5/8 in.
Inside diam. of dry pipe	6 1/8 in.		6 1/8 in.
Exhaust nozzles	Double.		Double.
" " tips	3 3/4 in.		3 3/8 in.
Weight of engine in working order	120,000 lbs.		126,870 lbs.
" on drivers	110,550 lbs.		110,650 lbs.
" on truck	15,050 lbs.		16,220 lbs.
Number of tubes	261		261
Size " " diameter	2 in.		2 in.
" " " length	12 ft. 11 1/8 in.		12 ft. 11 1/8 in.
Total heating surface	1,879 sq. ft.		1,879 sq. ft.
Grate, width	41 1/4 in.		41 1/4 in.
" length	101 1/8 in.		101 1/8 in.
" area	29 sq. ft.		29 sq. ft.
Number of pair of driving wheels	4		4
Diameter of driving wheels	50 1/4 in.		50 1/4 in.
Total wheel base	21 ft. 9 in.		21 ft. 9 in.
Pressure of steam carried	175 lbs		160 lbs.
Fuel	Bitum. coal		Bitum. coal
Rigid wheel base	14 ft.		14 ft.

Engines identical in every respect except as noted above.



INDICATOR DIAGRAMS COMPOUND AND SIMPLE LOCOMOTIVES.

(*For data see Table.*)

The cuts show the general construction of the engines, and extracts from Mr. Vail's report are given in what follows. The table gives data with reference to cards Nos. 1 to 24 inclusive, which were taken during the test.

Apparatus Used.—Both engines had the cylinders piped for indicators in the usual way, the pipes being carefully lagged with asbestos and felting. A high grade pyrometer was inserted in the smoke-box midway between the flue sheet and the diaphragm, and placed so as to be in full view of the operator on the front end. A vacuum gauge was connected with the smoke-box by a ¼-in. pipe passing from the gauge to the cab, and by a return bend to the smoke-box, the object in this long connection being to do away with the constant jumps and vibrations of the water column.

The vacuum gauge was made of two ¼-in. glass tubes 36 in. long, connected at the bottom with a rubber tube and half filled with colored water. A Thompson water meter was connected with the feed pipe, and used to measure the water fed into the boiler. Only part of the test was made with the meter when an accident disabled it, the water consumption for the remaining time being taken up by means of a graduated float. The feed water test of the standard engine is based on readings from the meter.

Method of getting coal consumption: The coal put on the tank was weighed on track scales at Buffalo, and on the return the coal remaining was weighed on the same scales. On the arrival of the engines at Olean the fires of both engines were cleaned and the front ends dumped. Then the fires were banked with coal taken from another engine, so that the coal noted as consumed is the amount burned while hauling the train only. No allowance was made for coal and water used on sidings.

Method of getting data: The weight of the trains is furnished by the freight department and is the actual train weight. All delays are noted and the time the throttle valve was closed was taken. Every two minutes of the run readings were taken of the steam gauge, pyrometer and vacuum gauge. Cards were taken on an average of every two minutes. The speed was determined by a Boyer speed recorder, the chart of which was used for the vacuum gauge statements. The number of times the injector was applied was noted, and a deduction made for the water wasted from the overflow.

No discrimination was made in regard to coal, the tenders being loaded at the regular coaling pockets, taking it as it came. The engineman and fireman were not instructed in any way as to how the engines were to be run or fired, each man exercising his own judgment, both in running and firing. The trains the tests were made with were regular scheduled trains, and the same time was made as with all other regular freight trains.

Compound engine No. 175 and simple engine No. 169 are exact duplicates, except the compound cylinders on engine No. 175. They were built at the same time, being two out of an order of seven.

The tests with engine 169 were made under favorable circumstances, the weather being fine and the rail good. The first test with the compound was made under the same circumstances as with No. 169, the second test with No. 175 was quite different, the run from Buffalo to Olean was made in the day time, weather fine and rail good. On reaching Olean, No. 175 was ordered to return to Buffalo with a train without having her fire cleaned or front end dumped out, and left Olean for Buffalo about 8:30 in the evening. The weather was bad and rainy and No. 175 slipped badly, consequently more fuel was consumed than on the former trip.

We were not quite satisfied with this test, therefore thought it advisable to make one more trial trip with No. 175, which was done under favorable conditions, the weather being fine and the rail good. This made three trial trips with the compound and two with the simple engine.

Our report shows the performance of the two locomotives in the tests made, which was done with great care and every precaution was taken to make the tests between the two kinds of locomotives as complete as possible.

COMPARISON OF FUEL AND WATER CONSUMPTION OF STANDARD AND COMPOUND ENGINES 169 AND 175.

First Round Trip Standard Engine; first Round Trip Compound Engine.

Engine.	Date.	No. of cars handled.	Weight of train in lbs.	Average weight of train.	Time on road.	Actual running time.	Time throttle was open.	Lbs. coal used.	Lbs. water used.	Lbs. train haul'd per lb. coal.	Lbs. water evap. per lb. coal.	Average steam pressure.
					Hrs. Min.	Hrs. Min.	Hrs. Min.					
Standard	Aug. 20	33 emp., south	738,860	1,697,730	10 55	8 16	7 1	12,800	86,150	132.6	6.73	145.7
"	" 21	40 l., 1 lt., north	2,656,590									
Compound	Sept. 1	47 emp., south	1,661,350	1,817,615	10 23	8 2	6 32	9,580	73,870	190.8	7.71	161.6
"	" 2	42 l., 2 lt., north	2,653,880									

Percentage of train hauled per lb. coal favor of compound ..... 30.5 per cent.

Percentage of water evaporated per lb. coal favor of compound ..... 12.7 per cent.

Second Round Trip Standard Engine; second Round Trip Compound Engine.

Standard	Aug. 27	47 emp., south	1,042,450	1,832,941	11 16	8 22	7 28	10,000	95,040	114.5	5.98	149.7
"	" 28	44 l., 2 lt., north	2,623,433									
Compound	Sept. 3	50 emp., south	1,661,300	1,865,559	12 59	8 47	No record	10,730	78,520	183.2	7.32	160.7
"	" 8	46 l., 2 lt., north	2,587,918									

Percentage of train hauled per lb. coal favor of compound ..... 37.5 per cent.

Percentage of water evaporated per lb. coal favor of compound ..... 18.3 per cent.

Second Round Trip Standard Engine; third Round Trip Compound Engine.

Standard	Aug. 27	47 emp., south	1,042,450	1,832,941	11 16	8 22	7 28	15,000	95,040	114.5	5.98	149.7
"	" 28	44 l., 2 lt., north	2,623,433									
Compound	Sept. 8	47 emp., south	1,662,675	1,976,454	11 35	7 60	6 58	9,740	78,460	203.7	8.03	160.6
"	" 9	45 l., 2 lt., north	2,870,233									

Percentage of train hauled per lb. coal favor compound ..... 43.8 per cent.

Percentage of water evaporated per lb. coal favor compound ..... 26.0 per cent.

Summary of all Trips made by both Engines.

Standard	Two round trips.	South	1,781,410	3,530,071	21 51	16 38	14 29	28,800	181,790	122.6	6.31	147.7
"		North	4,279,033									
Compound	Three round trips.	South	8,177,175	5,760,628	34 57	24 25		50,010	230,850	163.2	7.60	160.6
"		North	8,362,131									

Percentage of train hauled per lb. coal favor compound ..... 38.2 per cent.

Percentage of water evaporated per lb. coal favor compound ..... 17.9 per cent.

VACUUM GAUGE BETWEEN BUFFALO AND EAST AURORA.

Speed, Miles per hour.		Vacuum Gauge, Inches.		Reverse Lever, Notch.	
Standard.	Comp'nd.	Standard.	Comp'nd.	Stand'd.	Comp'nd.
10	17	7	2	6	2
24	22	7	5	8	2
25	25	7	3	9	6
20	26	6	3	9	6
21	23	4 1/16	2 1/16	9	6
19	21	4	2	9	6
16	19	5	2 1/16	9	6
22	18	5	2	8	6
25	18	6	2 1/16	8	6
21	19	7	3	8	2
18	15	8	1	8	6
17	14	8	0 3/4	8	6
16	12	8	1	7	6
10	11	5	1/2	2	6
22	10	8	1/2	8	6
18	9	5	1/2	8	6
16	20	4	3 1/16	9	2
23	22	6 1/2	6 1/2	6	2
20	18	5 1/2	4 1/2	9	2
20	15	6	3 1/4	9	2
21	13	8	1 1/2	9	6
23	14	8	1 3/4	8	6
22	20	10	5 1/2	8	3
20	23	9 1/4	4	8	3
20	25	6	4 1/2	8	3

Standard engine hauling 47 empties.
Compound engine hauling 50 empties.

SUMMARY OF PYROMETER AND VACUUM GAUGE READINGS.

All trips made.

Date.	Trip.	Engine.	Average pyrometer Deg. Fahr.	Average vacuum gauge. Inches.	Highest pyrometer. Deg. Fahr.	Highest vacuum Inches.
Aug. 20	South	Standard 169	655	5.4	820	9.5
Sept. 1	"	Comp'nd 175	594	2.6	812	7.0
Aug. 21	North	Standard 169	709	6.6	870	10.5
Sept. 2	"	Comp'nd 175	639	3.6	730	7.0
Aug. 27	South	Standard 169	700	6.5	887	11.0
Sept. 8	"	Comp'nd 175	646	4.7	774	6.5
Aug. 28	North	Standard 169	695	7.1	855	11.0
Sept. 9	"	Comp'nd 175	642	3.8	774	6.0

NOTE.—Compound trip of Sept. 3 not included.

FEED WATER TEST BETWEEN BUFFALO AND MACHIAS.

		Standard.	Compound.
Total pounds feed water used	Lbs.	44,788	30,628
Feed water used per hour	Lbs.	19,475	16,619
Average I. H. P. per hour	I. H. P.	6,847	702.5
Pounds feed water per I. H. P. per hour	Lbs.	28.44	21.7
Pounds steam accounted for by indicator, per I. H. P. per hour, at release	Lbs.	25.04	18.01
Percentage of feed water accounted for by indicator	p. c.	81.	76.
Loss due to leakage, condensation and other causes	p. c.	19.	24.
Percentage of feed water used per I. H. P. per hour favor compound	p. c.		46.6

NOTE.—Cylinder cocks and piston packing on compound leaking.

Vauclain Compound Locomotive.

VACUUM GAUGE AND PYROMETER IN CONNECTION WITH SPEED AND CARD DATA BETWEEN BUFFALO AND HOLLAND.

Speed. Miles per hour.		Boiler press. Lbs.		Throttle.		Reverse Lever Notch.		I. H. P.		Vacuum gauge In.		Pyro. m't'r Deg. Fahr.	
169	175	169	175	169	175	169	175	169	175	169	175	169	175
21	27	8	158	198	Full	Full	9th	6th	558	709	6	3	694	695
20	26	0	149	171	"	"	"	"	565	759	4½	2½	694	617
23	24	5	157	165	"	"	"	"	682	709	4	2	639	572
22	25	4	155	160	"	"	"	"	67	8	5	2½	693	594
15	24	0	153	170	"	"	"	"	670	617	5	2	639	549
16	16	4	146	168	"	"	8th	"	672	542	6	2½	594	572
22	23	4	145	169	"	"	"	3d	748	766	7	3	717	617
17	0	14	3	149	173	"	"	"	"	691	709	8	3½	717	692
15	9	30	0	151	160	"	"	7th	6th	694	849	8	3½	819	630
21	5	16	4	154	170	"	"	8th	4th	823	832	8½	2½	717	649
20	0	15	2	158	168	"	"	"	"	649	657	4	2	694	630
24	24	3	143	175	"	"	9th	"	695	719	5½	2	752	692
19	7	12	6	150	174	"	"	"	2d	57	692	6	2½	694	617
22	5	11	6	153	172	"	"	"	6th	735	699	8	3½	692	594
23	5	13	4	155	172	"	"	"	2d	742	707	7	3½	729	680
13	4	10	0	156	169	"	"	6th	"	636	985	4	3½	752	583
7	2	21	5	139	169	1½	9½	1st	6th	423	691	5	3	717	528
15	4	32	6	140	170	Full	8½	7th	"	676	741	6½	3	694	692
16	1	11	6	165	170	"	Full	"	3d	783	825	4½	2½	717	594
27	8	15	2	142	172	"	"	10 h	6th	474	963	4½	2½	6-9	594

DATA OF INDICATOR CARDS.

No. of indicator cards taken.	Style of engine.	Boiler press. Lbs. per sq. in. above atmosphere.	Throttle opening.	Reverse lever notch.	Revolutions per min.	Pressure at release lbs. per sq. inch.
1	Compound	168	Full	6th	108	25
2	Standard	146	Full	8th	108	66
3	Compound	156	Full	6th	108	24
4	Standard	144	Full	9th	102	44
5	Compound	174	½	6th	84	24
6	Standard	154	Full	10th	132	55
7	Compound	173	Full	4th	96	30
8	Standard	154	Full	7th	96	83
9	Compound	173	Full	4th	102	33
10	Standard	158	Full	8th	120	54
11	Compound	174	Full	6th	144	4.5
12	Standard	152	Full	10th	162	37
13	Compound	172	Full	6 h	102	25
14	Standard	151	Full	8th	102	70
15	Compound	172	Full	6th	78	26
16	Standard	154	Full	8th	96	67
17	Compound	170	Full	1st	72	40
18	Standard	150	Full	1st	84	120
19	Compound	170	Full	2d	78	38
20	Standard	136	9½	1st	48	114
21	Compound	173	Full	2d	96	40
22	Standard	155	Full	5th	96	89
24	Compound	161	Full	3d	102	32
24	Standard	155	Full	7th	108	80

Master Car Painters' Convention.

The Master Car and Locomotive Painters' Association held its 22d annual meeting in Washington, D. C., on Sept. 9, 10 and 11, President Joseph Murphy in the chair. Sixty-two members were present. The annual report of the Secretary showed the association to be in a flourishing condition.

The election of officers for the ensuing year resulted as follows: President, Jas. A. Gohen, Chesapeake & Ohio, Huntington, W. Va.; First Vice-President, Wm. O. Quest, Pittsburgh & Lake Erie, Pittsburgh, Pa.; Second Vice-President, W. J. Orr, Buffalo, Rochester & Pittsburgh, Rochester, N. Y.; Secretary and Treasurer, Robt. McKeon, New York, Pennsylvania & Ohio, Kent, O., (elected for the eighteenth year).

Cleaning Cars.—The first subject discussed was, "Is There a Chemically Pure Soap That Can Be Safely Used for the Purpose of Cleaning the Outside Varnished Surface of a Passenger Coach?" Wm. O. Quest read a paper, followed by Thos. Bryne. The Secretary also read a paper from J. H. Speer, who was unable to be present. In all the papers the free use of soap was condemned as being injurious to the varnish, and other methods of cleaning were advocated. All soaps had a certain amount of alkali in them, and unless used with great care were ruinous in their application. Many members related their practice. Mr. Brown told of a simple and safe material and exhibited a piece of shellaced panel that had been standing in this cleaner for four days, and had not a mark on it. It is simply kerosene oil. It does not retain any of its greasy properties, it will evaporate of itself, and will not cause gum while in service; it softens the dirt. "I have not been using it generally, but am convinced it would be practical where the car is very dirty. I use No. 0 pumice stone with the kerosene, and I have made up my mind it is just the thing we want."

Mr. Winters uses golden mineral oil and has done so for several years. One pound of No. 00 pumice stone to one pint of naphtha; by adding one gallon of the oil, he can put this on and let the car run a week without injury, then wash it off clean for revarnishing; he had cars out over a year, and when cleaned in this way the lustre came back as good as when first turned out.

Mr. Bishop said this was not new. He had used it to some extent, but not generally, as he did not know the exact formula. Mr. Lowry (Chicago, Burlington & Northern) uses oxalic acid with satisfactory results.

Painting Engines.—Can a new locomotive receive a durable finish in 10 days? Mr. Moriarty and Mr. Coleman read papers on this question. Mr. Moriarty said there were two essential features in a good job, time and good material. Some of us have the time, but not the material. In some shops the painter was expected to make up for time lost by the machinist. Rapid methods of painting could not be relied on. He had seen engines painted in 10 days that turned out to be durable, but thought it was good luck. Mr. Coleman (Intercolonial) said in his paper that an engine could not be painted in 10 days. He uses no lead on engines, but iron ore mixed with raw oil, then fills up with English filling, applies his color and gives two coats of wearing varnish.

Mr. McCullum (Pennsylvania) said his road had two plans of painting an engine—a 5-day and a 10-day. The 10-day was considered durable, the 5-day was something else, but they had to get them out sometimes in that short time. They did not call a job durable that did not run 18 months before coming in.

The President had seen an engine painted in three days and it was durable, but it had simply two coats of metallic oil paint and was lettered with oil color.

Mr. Putz (Wisconsin Central) stated that on roads that have many tunnels the durability is less; he finished some engines in ten days, but preferred 15.

Mr. MASON (Pennsylvania): We paint engines frequently that from some local cause don't keep in good condition more than four or five months. I don't think that is due to the system of painting. We turn out from 50 to 60 engines a month. I use acid and water to neutralize the rust on a tank where it has accumulated in the yard. We don't consider an engine durable that will not run 18 months.

It was voted as the sense of the convention that when an engine is painted in 10 days and comes in and is revarnished it should give two years' service.

Poor Materials.—The next subject on the list was, As an associate body can we exert an influence on the purchasing power that would remedy, where necessary, the quality of materials furnished? An item of great importance when viewed from the standpoint that the best procurable is the most economical, as demonstrated by practical experience. James A. Gohen, Robt. McKeon and A. T. Schroeder presented lengthy papers on the subject which went to show the difficulties we labor under by having poor stock and tools in the car paint shop. They advocate a closer acquaintance with the purchasing power, and frequent council as the remedy which would insure great benefit to the roads.

Head Linings.—The next subject was, "How Should the Wood Head Lining of a Passenger Coach Be Treated?" Jno. T. McCracken (Jackson & Sharp Co.) presented a paper, followed by one from Mr. Welch (Laconia Car Co.). There was also a paper by Alex. Campbell, of the Manhattan Elevated road, New York. The methods of the three gentlemen differed only in that some were using terra alba filler and the others corn starch. A general discussion followed. Mr. Putz used corn starch, which he considered equal to terra alba if mixed properly. I use in mixing one part raw oil, one part Japan filler and one part gold size, and reduce with turps. No matter what material you use, if it is not well protected with varnish it will not stand atmospheric influences. Too much shellac is used on this class of work. I simply give a very thin coat of shellac and two coats of finishing varnish, and our linings stand well.

Mr. BURLOW: We have cars built at Pullman, but the linings soon give out, especially over the lamps and around the stoves, and after two years' service they have to be scraped off and finished over.

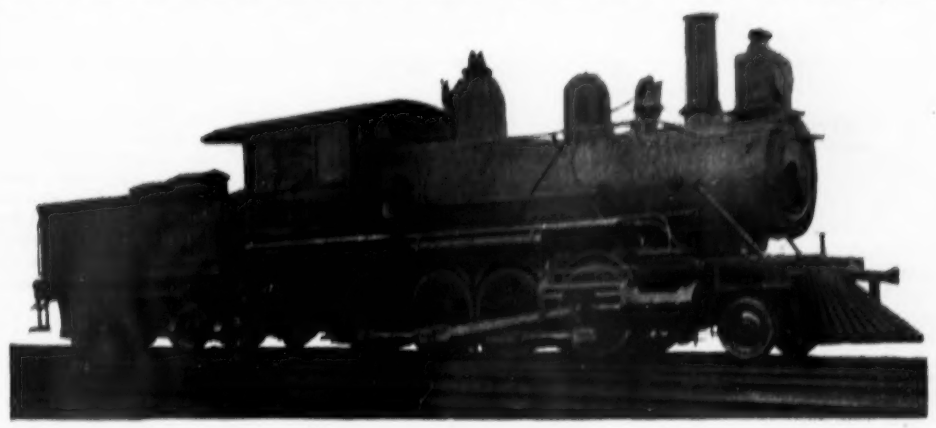
The PRESIDENT: Terra alba is a better filler than corn starch; we have cars with new head linings that did not run over a year before they had to be scraped. I attribute this to the lack of varnish.

Mr. QUEST: There is an affinity between glue and corn starch. That is where the trouble is. I destroy that by coating the raw lining with oil; I also back up the lining with two coats of metallic paint.

Mr. STOUT: I have tried the oil, but I believe one-third oil, one-third turps and one-third gold size will do better.

Rough Stuff.—The next question was, Should rough stuff be discarded on the outside of surface of a passenger coach? Mr. Bishop read a lengthy paper in favor of using the rough stuff finish.

Mr. Schellar, (P., W. & B.) Wilmington, Del., spoke at length. He said: I think rough stuff should be used. It is not the cause of cracking; the varnish is the cause. It is the varnish maker's fault. Lead rough stuff is the best. I take boiled oil, heat it to a great heat, and coat the car with the hot oil on the bare wood. Don't spare the oil; put on two gallons on a 60-ft. car. The next morning it is all absorbed. Then I put on the priming, mixed with equal parts oil and turps. Mr. Leopold said the hot oil priming would not do in a warm climate. It would keep sweating out with the hot sun and ruin the painted surface. You cannot in



Simple Locomotive.

LOCOMOTIVES TESTED ON THE WESTERN NEW YORK & PENNSYLVANIA RAILROAD.

our climate use oil, but must use hard drying colors to give good results. Mr. Keil uses rough stuff on panel work, but does not think it practicable on beaded work. Mr. Bishop uses rough stuff on all classes of work. Mr. McKeon abandoned rough stuff three years ago, and is satisfied the work wears equally well without it. He gives two coats of surface filler, quite thin, then sandpapers it, and he finds the varnish holds out better on this than it does to use rough stuff and rub with pumice stone, as the edges will be cut more or less in rubbing on panel work. He uses a scraping filler over the priming coat, but not on beaded work. Favors discarding rough stuff, both on the ground of economy and that the paint gives better service.

After a lengthy discussion a motion prevailed that it was the sense of the meeting that rough stuff should not be discarded on passenger cars. The matter of inspecting the interchangeable test panels, which had been painted and exposed for 10 months in different climatic sections of the country, was, for want of time to do justice to it, given into the hands of the Secretary, who was directed to examine and make a report after the adjournment.

Queries.—The list of queries was fully discussed and valuable information given.

No. 1. Would it be advisable to form a bureau of information in connection with our association? The Committee on Information, consisting of three members, had attended to this duty, but the number was increased to five, and the committee will be known as a bureau of information.

No. 2. Do you use all or part shellac on the hard wood inside finish of passenger cars? It appeared that the majority used shellac for foundation over the filler and finished up with varnish, but Mr. Brown was one who used all shellac with good results. It was brought out during the discussion that there was more durability in shellac than many gave it credit for, but the surface should be oiled over occasionally while in service, which some said was the secret of its durability.

No. 3. How do you prepare your stack blacking for locomotives while in service? Boiled linseed oil and lampblack, made very thin, seemed to be used by many. Put it on when the stack is warm. Some used plumbago and rosin reduced with naphtha, put on with a piece of waste, and claimed it would outwear the stack. Dixon's graphite was used by the President, and he believed it stood more heat than anything else. Mr. Aquart used drop black thinned with turps; apply with a sponge. Mr. Bigelow used boiled oil, lamp black and tallow. Mr. Brown used drop black, raw oil and varnish. Mr. Laing used asphaltum; also Mr. Given. Mr. Moriarty used lampblack and boiled oil. Mr. Mason, raw oil and lamp black; found boiled oil unsatisfac .cy.

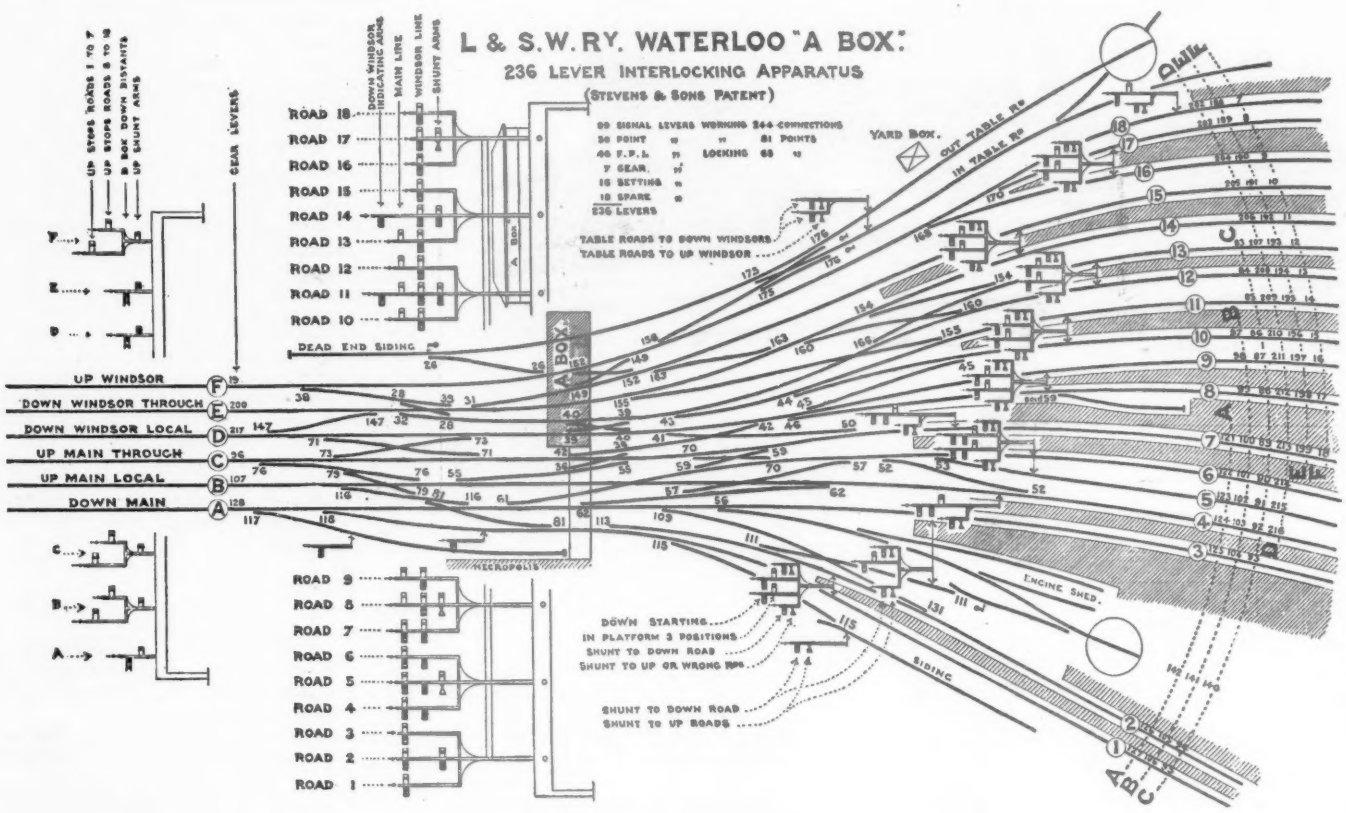
No. 4. What materials do you use and how long do you take to paint your freight cars? A majority of the members were using Prince's metallic paint and boiled oil, and report the time required to paint a car three days, although in good weather it could be done in two days by second coating and stenciling on the second day.

No. 5. How do you keep your paint stock and brushes in the most serviceable state? It appeared tha shops had a stockroom with a man in charge who takes care of all stock, giving it out only on the order of the foreman of the man in charge of the gang; each man had checks which represented the different class or sizes of brushes, and when a brush was given out a check was left in its place. Some shops allow the coaters, varnishers and stripers their own tools, with a cupboard to keep them in. It was the sense of the meeting that no matter how small the shop, there should be a stockroom furnished for the proper care of stock and tools.

No. 6. What is the best formula for preparing floor paint for passenger cars? Some did not paint floors, others gave them shellac over the color, which in many shops was a standard paint adopted by the road. Shellac hardens the surface, and will outwear varnish. All kinds look well when run out, but don't last long.

No. 7. What are your views concerning piecework? The general opinion was, it is what all must come to; it was giving the best of satisfaction in all shops where it was tried, and a large number of members were running their shop on that plan. The companies were getting their work done for two-thirds the expense for labor that it cost them under the day and hour system. Some said it would not work in a small shop; others who had adopted it stated they would not change back if they had but two men, and in all cases the workmen were better satisfied and making better wages; so that both employer and employé were greatly benefited by the introduction of piecework.

The convention will next meet in Detroit, Mich., on the second Wednesday in September, 1892.



INTERLOCKING AT WATERLOO STATION—LONDON & SOUTHWESTERN RAILWAY.

The Slide Railroad at the Columbian World's Fair.

A company has been organized to build a slide railroad, or gliding railroad, or chemin de fer glissant, for the Columbian World's Fair, and contracts are in negotiation for the structure and for the machinery and rolling stock, if it may be called so. The section built will be about one mile long, from Cottage Grove Avenue through the Midway Plaisance to Jackson Park. The structure will be elevated, giving 16 ft. head room in the clear and will carry two tracks. It is proposed to have sufficient capacity to run a five-car train every half minute.

The sliding railroad which was shown at the Paris Exposition of 1889 will be remembered as having been one of the most striking novelties to be seen there. An excellent account of thatinstallation with an historical account of the growth of the idea will be found in *Engineering* Sept. 27, 1889, p. 371. The idea goes back at least 40 years to M. Girard, an hydraulic engineer; but it was first put in practical shape by M. Barre at the Paris Exposition of 1889. M. Barre is the moving spirit in the Chicago enterprise, and having made his preliminary business arrangements here he has returned to Paris to work up the mechanical details. Probably we shall be able later to give an accurate and detailed description of this new installation, but meantime it may be well to describe briefly the system, details of which the reader may have forgotten.

The cars slide on a film of water and are propelled by water jets. The slides on which the cars rest are hollow cast iron boxes. In the middle of each box is a socket to receive a spindle which supports the carriage, which has sufficient play to allow the carriage to pass around curves. For short runs a tender carries water under sufficient pressure to supply the slides. For longer runs there will be reservoirs under the carriages which will be replenished from the power pipe. The working pressure will be 200 lbs. per sq. in. The water is carried from the tender by pipes under the carriages and these pipes have branches which lead to each shoe. The train when in motion is supported entirely on the film of water.

Water under pressure is discharged against a bucket rack fixed under each carriage, and this imparts motion to the train. Each rack hastwo rows of buckets, the angles of the webs of these buckets being set in opposite directions. The water for propulsion is discharged against these buckets by fixed nozzles in the roadway; and ther are two sets of nozzles so as to give a forward or backward motion to the train.

The pumps and hydraulic machinery will probably be furnished by Henry R. Worthington. The capacity of the machinery will be about 800 H. P., with a proper reserve for accidents.

A contract exists for the construction of two miles of similar railroad in London, as an extension of a portion of the Metropolitan Underground. This has been under consideration since 1889 and it is now said positively that work will begin within a very few months.

Big Day's Work at Waterloo Station.

A London correspondent has sent us, with the accompanying diagram of the yard at the great Waterloo Station of the London & Southwestern, in London, a statement of the number of trains handled at that station on Saturday, July 11, the occasion being the review of volunteers before the German Emperor at Wimbledon. Portions of the "down Windsor" line and one of the up main lines have been put in use since the 1st of April last, materially increasing the capacity of the road, and this is much the heaviest day's movement ever known at Waterloo. And as this is the largest passenger yard now in use, it is probably safe to say that this record shows the heaviest day's work ever known at a single station. The details of the records are as below. The figures are for 24 hours, but the bulk of the traffic was worked in about 15 hours. The down Windsor through line and the up main through line are used chiefly for empty trains and light engines. American readers will bear in mind that "up" means toward the station (toward London); and "down" means from the station; that "road" means track, and that, in accordance with the universal English practice, the semaphore arms are on the left of the posts as seen by enginemen.

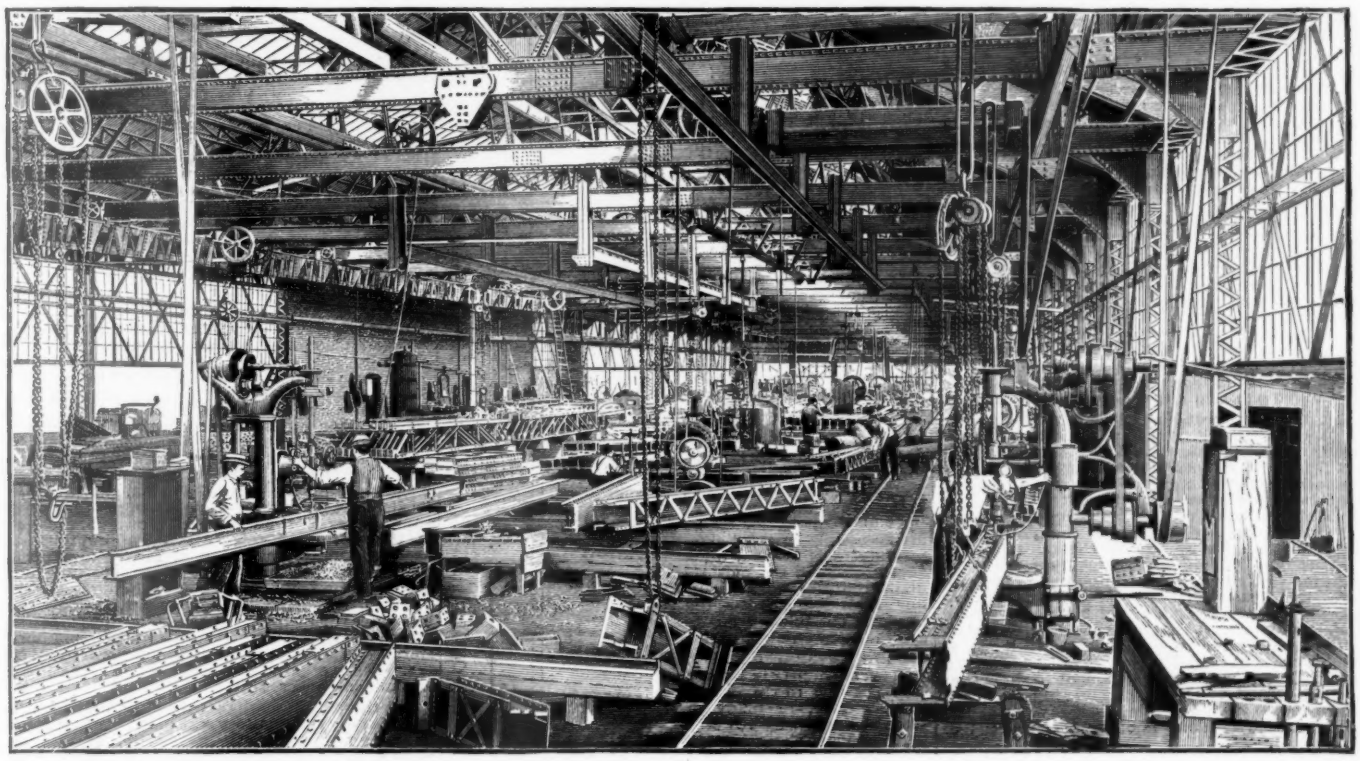
Total number of trains in and out of Waterloo on Saturday, July 11, 1891.

	Down Main.	Up Main.	Down Windsor.	Up Windsor.
Trains	111	121	136	123
Engines	27	53	32	14
Empties	25	53	60	24
Specials	27	33	8	12
	190	260	236	173
Total				859

The New Shops of the Berlin Iron Bridge Company.

Few concerns in this country have had as large experience in designing and building manufacturing plants as the Berlin Iron Bridge Co., and we have pleasure in giving some description of the plant lately built at East Berlin, Conn., by the company for its own work.

The old plant of the company is situated on the west side of the Mattabessett River, in the town of Berlin, Conn., and includes about five acres of land well covered with buildings; but like a large class of the manufacturing plants in this country, the buildings were originally designed for but a limited amount of product, and as the business of the company has extended, additions have been made until the original buildings have sunk into insignificance and the additions are the greater part of the plant. Owing to the limited amount of land available the company decided to build its new plant on the east side of the Mattabessett River, connected with the old plant by an iron bridge of sufficient capacity to not only carry the narrow guage cars which move material about the premises, but also to carry an ordinary standard guage locomotive and loaded cars.



Interior View, from a Photograph.

The general plan of the new plant comprises about three acres of land located along the line of the New York, New Haven & Hartford Railroad. The main building is 400 ft. long by 80 ft. wide, constructed entirely of iron and glass. The general features of the construction are shown in the interior view, made from a photograph.

The sides of the building are made of glass for a distance of 10 ft. from the eaves and below that are constructed of iron sliding doors, so arranged that they can be opened and closed quickly in order to allow the material to enter through the sides of the building, when necessary, and in summer they can be removed and thus very materially add to the comfort of the employés.

The roof trusses are of iron, each truss designed to carry 100,000 tons at any point along the line of the lower chord.

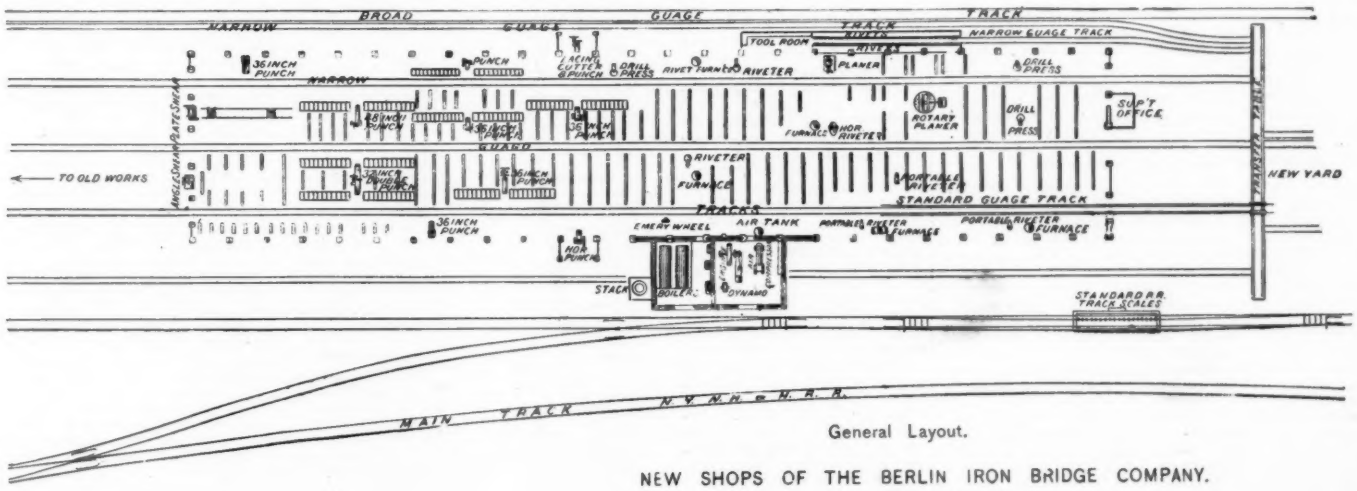
The whole plant is connected by standard gauge tracks in such a way as to admit of the economical loading of the finished product. The tracks extend the whole length of the plant; on each side and at the front of the building from which the finished product is discharged there are spur tracks of standard gauge, one of which enters the building for a distance of 120 ft., so as to admit of iron being loaded inside. All tracks are commanded at the front of the building by two jib cranes, so arranged as to work from a four drum Mundy hoisting engine, so that one man can operate both cranes at one time. Ten cars can be loaded in an ordinary day of 10 hours.

The building itself is served by three lines of narrow gauge tracks, one on each side and one through the middle, the tracks being connected at each end of the building by transfer tables, the transfer tables also connecting these tracks with the tracks in the yard. The raw material is distributed on each side of the main building direct from the cars, and after being sorted is moved by means of the narrow gauge tracks into the north end of the shop—the end shown on the left of the illustration—where it is laid out from templets, trimmed at the shears and prepared for the punches. The punches are all arranged with a "drop motion," so that the punch can drop down on the work, and thus the operator is able to find the centre mark and punch the hole exactly in the proper place. From the punches the material goes to the riveting machines, and the riveters to the planers, drills, &c., and out at the south end of the shop, so that under no circumstances is there any reason for work to pass except in one direction through the shop, the raw material coming in at one end and the finished product going out at the other.

The interior of the building is lighted by the windows on the sides, and also in each side of the roof the whole length of the building is a skylight 12 ft. long, so that the entire length of the building is so well lighted that the finest work can be done in any part of it.

The building is heated by the Sturtevant system of hot air, and all furnaces, both under the boilers and for rivet heating are equipped with fuel oil burners and crude petroleum is used entirely for fuel through the whole plant, although the boilers are so arranged that coal can be used if desired. The plant is lighted by a Thomson-Houston dynamo with 250 incandescent lamps and 12 arc lamps, all on the same circuit,—the arc lamps being used to light the yard and general light for the shops with two incandescent lights at each machine.

The whole plant is constructed of iron with no wood about it, and the company is not obliged to carry any insurance. The construction being of iron the cost of maintenance consists only in painting.



General Layout.

NEW SHOPS OF THE BERLIN IRON BRIDGE COMPANY.

Railroad Passenger Fares in Hungary and England.*

When it comes to the railway systems of the two countries (England and Hungary), comparison between them must surely be out of the question. In size, the two countries are almost absolutely identical, the area being 124,000 square miles in the case of Hungary, as against 120,000 in the case of Great Britain. The population of Hungary is about 17,000,000—a little less than half our own. Its railway mileage is, in round figures, 6,500 miles, or say one-third of ours; and about three-fifths of this length is owned and worked by the state. . . . In the 12 months prior to the introduction of the zone system in August, 1889, the 3,800 miles of the Hungarian State Railway system only carried about 5,700,000 passengers; in other words, barely three quarters of one per cent. of the number of passengers who traveled on the railways of Great Britain during the same period. Moreover, Hungarian passenger travel, so far from increasing, was not merely stationary, but actually declining, for in the year 1886 the numbers had very nearly reached 6,000,000.

*Extracts from a paper by Mr. W. M. Acworth in the *Nineteenth Century* for September, 1891.

It is worth our while to realize how absolutely insignificant the passenger traffic of Hungary was. . . . The little North London Company, with its 12 miles of line, carried six times as many passengers as the whole of the Hungarian State Railway system, . . . a petty company like the North Staffordshire carried more passengers by half a million. . . . The three railways which serve Ulster, with one-quarter of the mileage, carried between them half as many passengers again; the two railways which serve the far north of Scotland—the Great Northern and the Highland, with one-fifth of the mileage, carried just about four-fifths of the number of passengers. In other words, in the portion of Great Britain where population is sparsest and railway traffic least developed, there were four times as many passengers per mile of line open as there were on the state railways of Hungary, averaging the whole of the country over. . . .

Another preliminary point should be noticed. . . . In one sense, every railway that ever existed has a zone tariff. The English zone, for example, has a breadth of one mile; we pay, that is, the same fare for a hundred yards beyond 49 miles as we do if we complete the entire 50. . . . The Hungarians have only carried the universally-adopted system one stage further. . . . Evidently in this there is a convenience to the railway management, which has to do fewer sums in arithmetic, and those of simpler nature; which is enabled to keep a smaller stock of tickets, and to employ less intelligent persons to issue and to check them. Equally evidently, however, there is no concession to the public. Supposing the fare to be the same to all stations distant more than 90, but not more than 100 miles from Pesth, the man who travels 91 miles obviously pays just as much more than his fair share as the man who travels 91 miles pays less. In fact, we shall not be wrong, if we say that the zone system, strictly so called, is neither more or less than a simple piece of administrative machinery of absolutely no interest to the public at large.

There are, however, two real novelties in the Hungarian system. The first is, that no through tickets are issued from stations on the one side of Buda-Pesth to stations on the other. . . . M. Baross' action in this respect goes far to neutralize to the Hungarians the value of what on paper is a most remarkable concession. The Hungarian fares, as has been said, advance by steps of so many kreuzers for each zone, or distance of ten miles. This rule, however, only holds up to the commencement of the 14th zone—say 135 miles. Beyond that point the fare is uniform; that is to say, the boundaries of the 14th zone extend right up to the frontiers of the country. . . . So that, owing to the impossibility of booking through the capital, it will be seen that, on the Hungarian system, the fare from Dover to Stafford, say 200 miles, is almost double that charged for the 740 miles from London to Wick. Now, it needs no argument to show that such an arrangement as this is impossible in Great Britain, with its numerous independent railway companies interchanging traffic with one another at hundreds of different points. . .

Though the system of reckoning by zones of ten miles instead of by single miles may be of no interest to the public at large, there are a certain number of theorists to whom its adoption appears of the utmost importance, for they regard it as constituting the first step taken by the railways in the direction of what we may call the penny-postage system. . . . It must be confessed, however, that the votaries of the penny-post idea have been met with in the ranks of the professors rather than among men with practical railway experience. . . . Let us say that the average cost of transporting a passenger in Great Britain is 2½d., including in that average not only the passengers between the Mansion House and Blackfriars, but also those between Euston and Inverness; and let us suppose that we fix a uniform fare of 2½d. accordingly. What now will happen? That the number of passengers from Euston to Inverness, each of whom presumably costs more than 2½d. for carriage, will multiply enormously can hardly be questioned. But what of the passengers from the Mansion House to Blackfriars? Will not ninety-nine out of every hundred abandon the two-penny-half-penny railway, and go above ground by omnibus for a penny? The shortest distance—that is, in other words, the least expensive passengers—having been driven away, it is evident that the average cost of carriage to the railway will be somewhat increased. Let us say that the average cost is driven up to 3½d., and that the uniform fare is raised to that figure. The same thing occurs once more; this time it is the passenger from the Mansion House to Victoria who is shaken out . . . and so on *da capo*. In fact, the advocates of uniform fares are in this dilemma: that a fare high enough to cover the average cost of the journey is too high to attract the short-distance passenger, to whom rival means of locomotion must always remain open.

We are then, I think, justified in regarding the adoption of zones as only an accident in the great reform with which the name of M. Baross is associated. Its essence consists in the sweeping reduction of the scale of fares by which the introduction of the zone system was accompanied. But if we say broadly that the old fares were a penny a mile third class express, while the new fares are a good deal less than a half-penny, we shall get an idea sufficient for all practical purposes of the revolution that has been wrought. As for its effect in Hungary itself, the figures have been quoted often enough. Where two passengers traveled in 1889, five are traveling to day. The gain to the public is undeniable; and the gain to the railways themselves is, likewise, no small one, for *under Hungarian conditions* it is more profitable for the railway to carry five passengers at a half-penny than two passengers at a penny. The carriages, which formerly ran almost empty, are now well filled, and it will be a long time yet before the lines and the stations become insufficient to accommodate all the traffic which is likely to come upon them. . . .

Hungary has fired the match, and the train has exploded all over Europe. Roumania has followed suit. Austria has adopted a modification of the Hungarian system, involving even more sweeping reductions from the old fares than its predecessor. Russia is said to be on the eve of moving in the same direction; in the Swedish and Dutch Parliaments there have been animated debates on the subject, and the adoption of the Hungarian system, with some modifications, is expected before long. The Prussian Minister of Railways has circulated throughout the kingdom a project of reform involving very large concessions in passenger fares, which, however, has been received in some quarters with outspoken disapproval, on the express ground that the concessions do not go far enough. The French Government is negotiating with the great railway companies for a reduction of about 30 per cent. in the third class passenger fares, in return for the abandonment of some portion of the very heavy taxes to which the companies are at present liable. . . . English passenger fares stand to-day practically where they were fixed by the Cheap Trains Act of 1844—at the level, that is, of one penny a mile. It is true that at the earlier date a passenger got in return for his penny the right to travel by one train a day, starting usually not later than six in the morning, in a cattle-pen, generally without a roof, frequently without a seat, at a rate seldom exceeding 15 miles an hour. At the present day he may take his choice of a dozen or twenty expresses, and travel in a luxurious cushioned carriage at a speed of 40 or even 50 miles an hour. But the fare per mile still remains fixed at the Parliamentary penny, though the volume of traffic has multiplied tenfold in the interval.

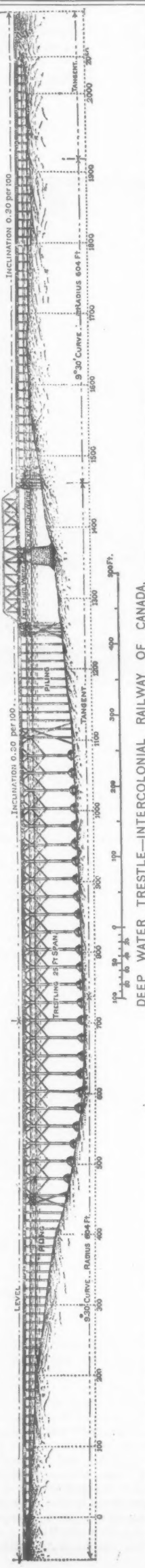
It is, of course, fair to remember that, what with workmen's trains and excursion trains, tourist tickets, season tickets, and other similar concessions, a vast number of people travel at fares far below the normal penny. It is also true that in England any reasonable quantity of luggage is carried free, that excess fares for express speed are practically unknown, and that England is the only country in which the crack trains are accessible to third-class passengers. But when all is said and done, the fact remains that, for a single journey from A— to B— the cheapest possible fare is, under ordinary circumstances, one penny per mile.

In every country in Europe it is possible to travel at a cheaper rate, in many of them at a rate which is very much cheaper. American railways are, let it in fairness be acknowledged, probably some 10 to 20 per cent. dearer. But a comparison with American railways would lead us too far afield. . . . A recent number of the German official *Archiv für Eisenbahnwesen* gives the fares for every country from Sweden to Italy. The price at which it is possible to travel third class ranges downward (I leave the figures in their German form, as the ratio between them is the only point of importance for our present purpose) from 5.5 kreuzers per kilometre in England and 5.42 in France, to 4.25 in Holland, 4.16 in Switzerland, 4.07 in Italy, and 3.92 in Sweden. It varies from 4.67 to 3.0 on the various German railways. It is 3.24 in Hungary, 3.0 in Belgium, 2.81 in Russia, and finally falls to 2.0 in Austria; while in North Germany there are fourth class fares, ranging from 2.5 in Oldenburg to 2.0 in Prussia, Saxony and Hesse for carriages without seats, that are made use of on occasion for the conveyance of cattle.

How comes it that, with a volume of passenger traffic unapproached in the world, in a country which, for so large an area, is more thickly populated than any other non-Oriental country, the fares remain at so high a standard?

The question is one whose importance can scarcely be overrated. The existence of England as the commercial centre of the world, as the home of a prosperous and increasing population, depends, more perhaps than on any other single cause, on facilities of railway communication. Adequately to answer the question would require a volume, not to mention knowledge and information to which the present writer can make no claim; but the outline of an answer may, perhaps, be given in the pages that follow.

One thing should be noticed at the outset. A mere comparison of money tariffs is entirely misleading. It is no accident that passenger fares in the United States range over a penny per mile; that in England they fall to nine-tenths of this sum; that on the Continent they drop gradually down to something like one-third of a penny in Hungary and Silesia; while in India they reach their lowest point, of less than a fifth of a penny per mile. Indeed, it would be no paradox to assert that, measured in terms of the ability of the average wage-earner to pay them, railway fares are highest in India, and lowest in England and the United States. As I have pointed out elsewhere, in India a workman's time is worth about 2d. a day; in England it is worth about 9d. an hour. The Hindoo, therefore, who wastes half a day to save three halfpence is a gainer, while the Englishman who spends an hour to save sixpence is a loser.



Railway fares, then, are high in England for two reasons: the one, that money is plentiful, and therefore, in accordance with the ordinary laws of supply and demand, will purchase a less quantity of commodities, whether eggs and butter or railway service is absolutely immaterial, in England than in Hungary; the other, that the time is valuable, and that passengers are therefore ready to pay a comparatively large sum of money in order to economise a comparatively small amount of time. Naturally, fares in England must be calculated on a higher scale than in Hungary, for the cost of hauling 50 passengers—which are all the English trains can wait to collect on an averege—is for all practical purposes the same as that of carrying the couple of hundred passengers which the less extravagant requirements of Hungary or India suffer to assemble between the departure of one train and the next.

"Well, then," it will be said, "by all means cut off the unnecessary trains—those competing expresses to Manchester and to Scotland, of which we have heard so much lately, for instance." . . . In the first place, it is more than questionable whether the abolition of competition would really enable the number of trains to be seriously reduced. . . . It is very doubtful whether English public opinion would submit to any wholesale cancelling of competing trains. German experience on this point is instructive. In the old days, before Prince Bismarck took possession of the Prussian railways, there was keen competition between the two rival lines from Berlin to Cologne and the Belgian frontier. When both lines were bought up by the state, the management found that local interests were strong enough to prevent the suppression of the existing trains. The heavy hand of the state was able to arrest all improvements and accelerations for a period of nearly 15 years; but the Kreiensen route and the Hanover route each succeeded in preserving the service they had already secured. Further, it should be noted that, though the crack expresses run by the great companies in competition with one another bulk large in the public eye, they only form a small fraction of the total passenger mileage of the country. The vast proportion of the trains are run simply to accommodate local traffic. . . .

But there is more than this. The cost of running a train is only the smallest part of the expense of providing and maintaining the railway service. Speaking in round figures, and avoiding intricate questions of railway accounting, it may be said that, of every penny a passenger pays, it is only one farthing that is devoted to what the Americans would call "train-movement expenses." Of the rest, a halfpenny goes to pay 4 per cent. interest to the capitalists whose money has built the road, and so made it possible for the public to travel at all; while the remaining farthing is absorbed in payments for the maintenance of the railway, the bridges and stations, in signalling, office expenses, rates and taxes, and similar charges, which are incurred to almost an equal extent whether 500 or 10,000 passengers travel over the road *per diem* . . . Bearing in mind the rough analysis of railway expenditure that we have just made, it is easy to show that a sweeping reduction in passenger fares must mean bankruptcy to a railway company unless it is largely compensated by increased passenger travel.

. . . Of course, in practice it is impossible to imagine half the trains being taken off, just as it is impossible to doubt that a reduction of fare by 50 per cent. would enormously increase the number of passengers. Let us assume for the sake of argument that the same result would happen here as has already taken place in Hungary: that for every two passengers traveling now, five would travel in the future, and that the railway companies would receive five halfpennies where now they obtain only two pennies. At first sight it seems as though they would have made an uncommonly good bargain. But let us look at the facts a little closer. It is all very well for theorists in their libraries to manipulate figures; to say that the average train at present carries only 50 passengers, while it has ample seating accommodation for at least 200; and to reckon that it will surely carry 125 without any difficulty. But, in fact, railway passengers refuse to be averaged; as it is, with the fares at their existing level, they pack every carriage to the last seat in the trains running into the great towns every morning. If every train is full from end to end at present, and the trains are following one another—as everybody knows they are—as close as they can at this present moment, where is room to be found to put the new passengers who desire to travel citywards? . . . Or, again, just as the average railway day is made up of a few hours that are overcrowded, and a large number of hours that are not half crowded enough, so the average year is made up of all the months from January to December. The expresses may be running in triplicate and quadruplicate in the first week in August, while in the first week of February they are hardly earning enough to pay for the grease of their wheels. Will the cheapest of cheap fares induce the British public to go to Scarborough or to the Highlands in February? Will they not, rather, add to the tremendous rush in August, by which our railways are almost overwhelmed already? . . .

If there is any force in the foregoing considerations, we are, then, brought down to this—that the effect of a reduction of fares would be to intensify the existing congestion of traffic. . . .

. . . Put in a nutshell, the railway passenger problem in England is this: Public opinion insists on English speeds, English frequency of service; insists on termini in the heart of our great cities, where the value of land is reckoned in pounds per foot. The ingenuity of English railway management has been taxed to give this accommodation at existing fares, and yet maintain the level of a four per cent. dividend; what hope is there that the companies can continue to give the same accommodation if the fare per passenger is reduced by one-half? Each square foot of Liverpool street and the lines approaching it can be made by extreme care to accommodate just enough passengers per diem to pay a reasonable rental for the space that is occupied. How is the space now required for one passenger to be made to hold two? And if not, how can the railway company afford to reduce fares in the Hungarian fashion?

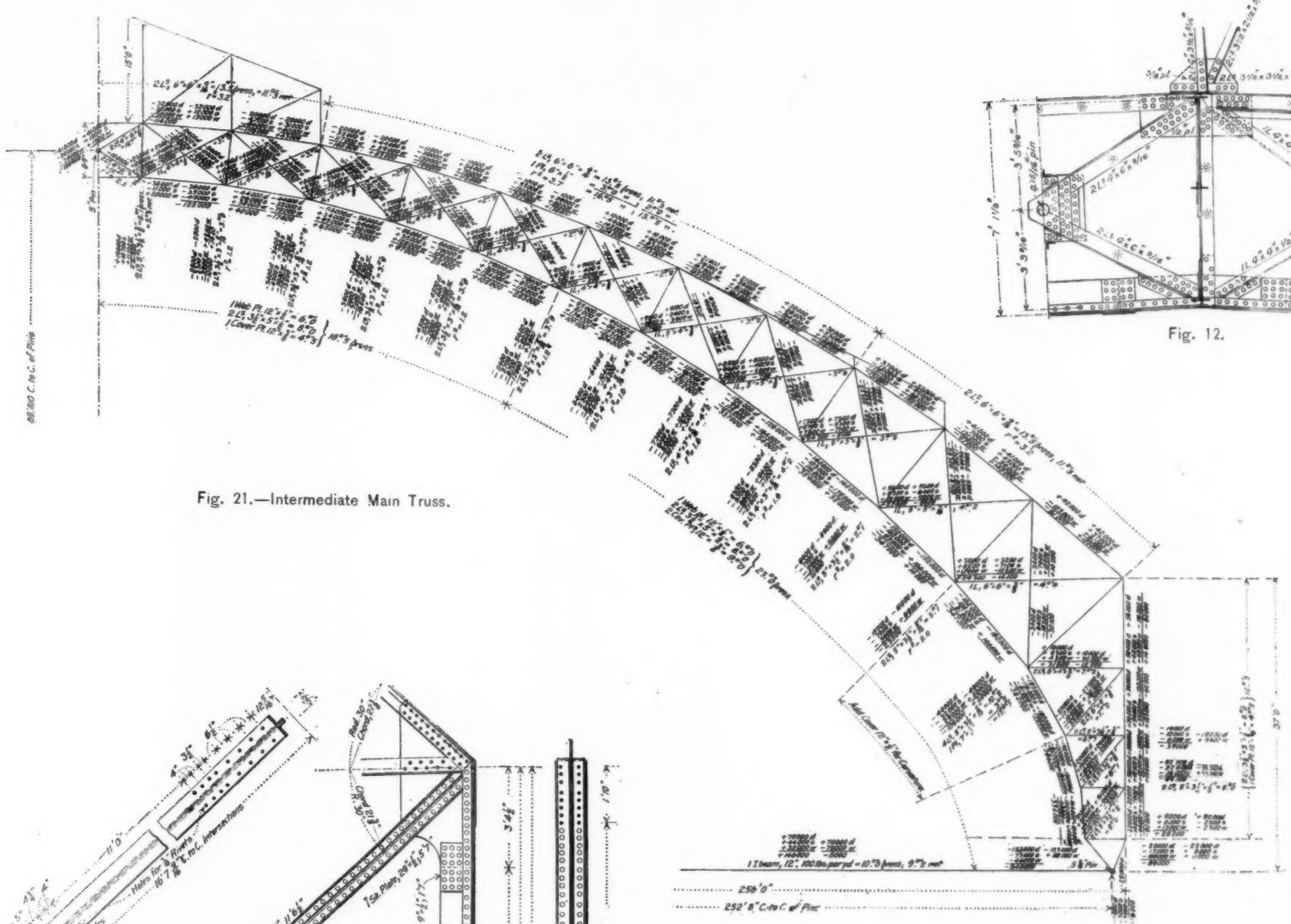


Fig. 21.—Intermediate Main Truss.

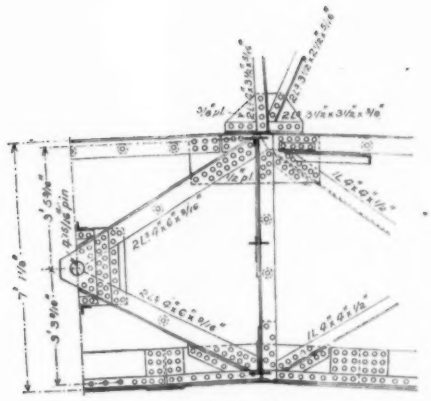


Fig. 12.

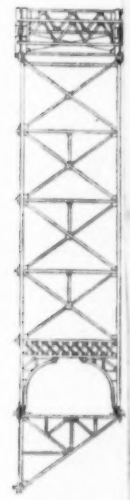


Fig. 13.—Wind

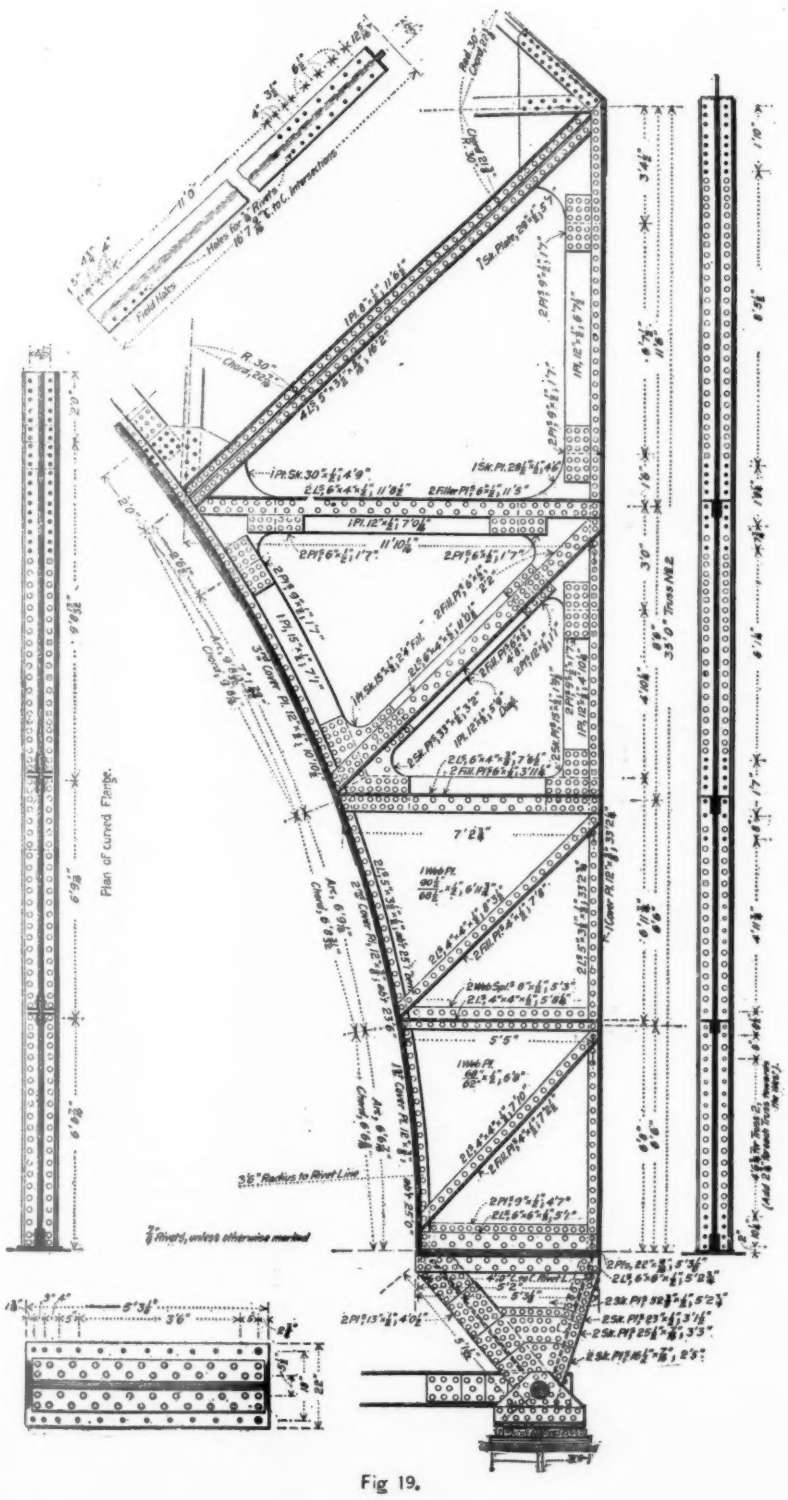


Fig 19.

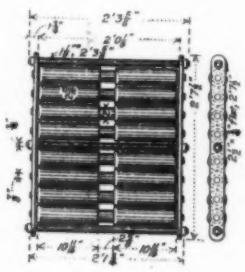


Fig. 20.

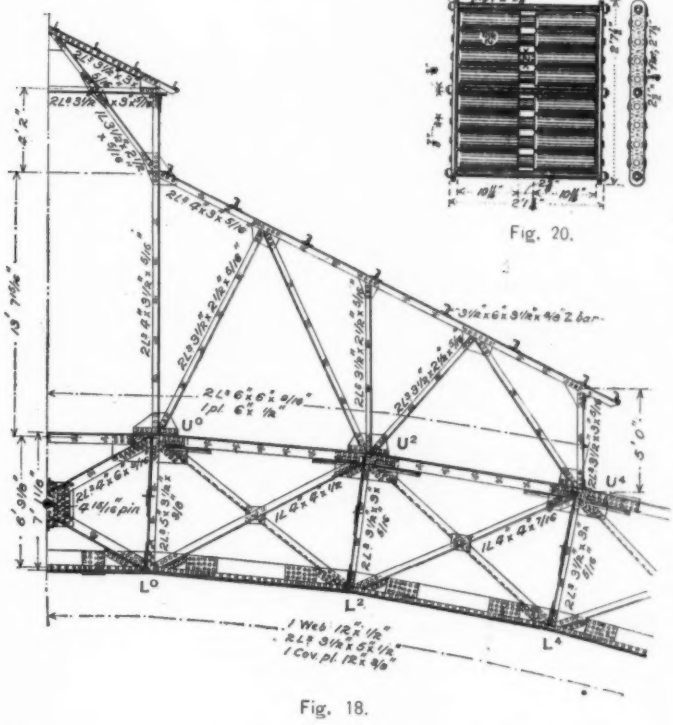


Fig. 18.

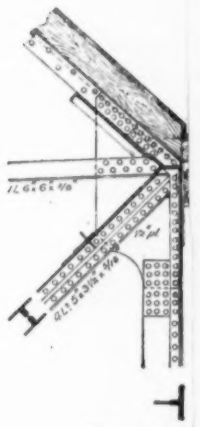


Fig. 9.

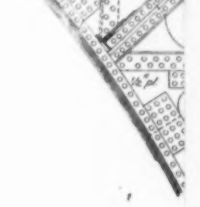


Fig. 8.

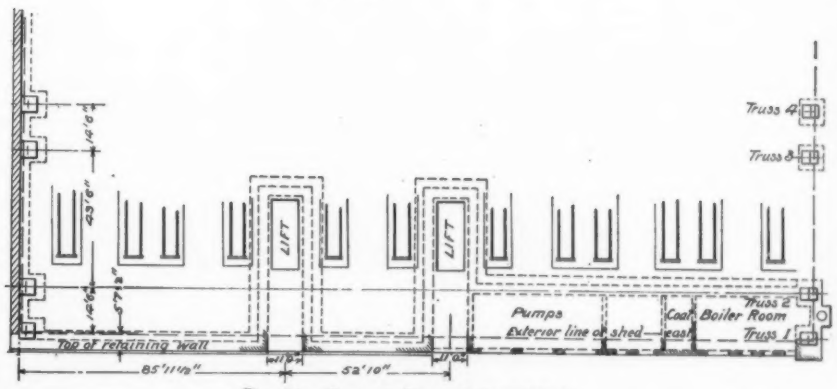


Fig. 14.—General Plan of Foundations.

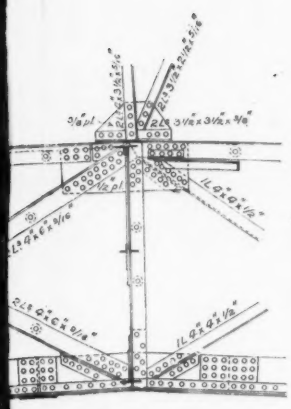


Fig. 12.

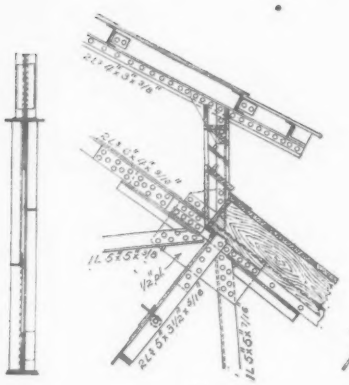


Fig. 10.

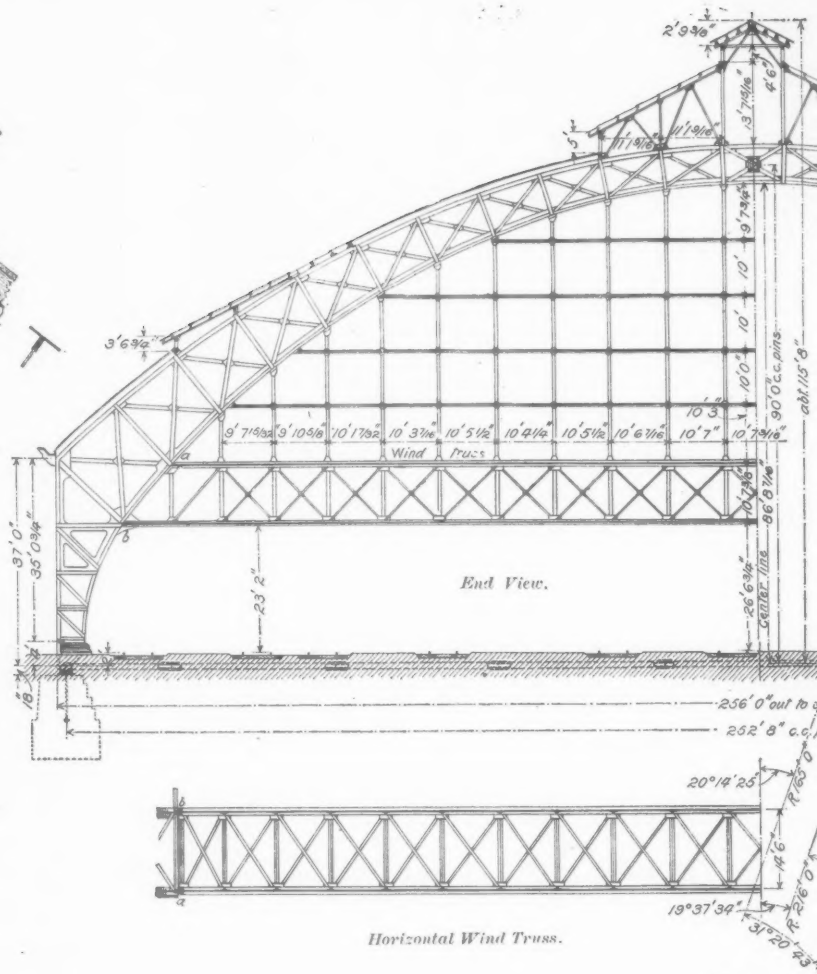
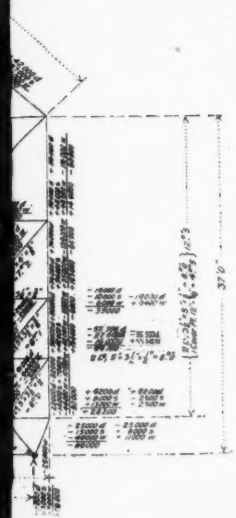


Fig. 3.

NOTE.—*The references in text to L 22, U 22, etc., are to the panel joints.—L for the lower chord, U for the
even to the right. Thus Lo (see Fig. 18) is the first joint in lower chord to right of centre; L 2 i*



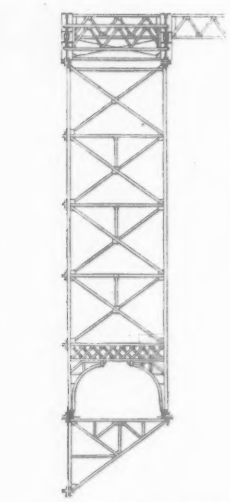


Fig. 13.—Wind Bracing.

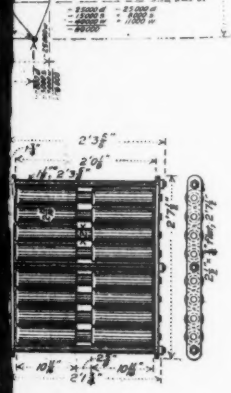


Fig. 20.

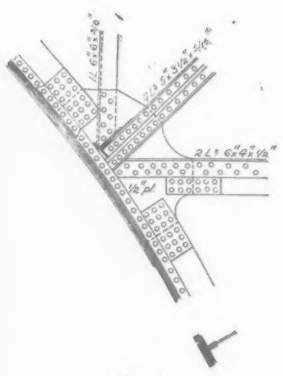


Fig. 8.

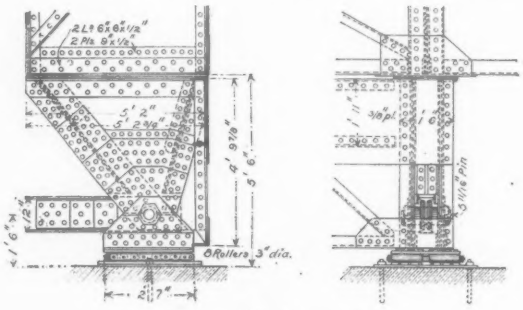


Fig. 4.

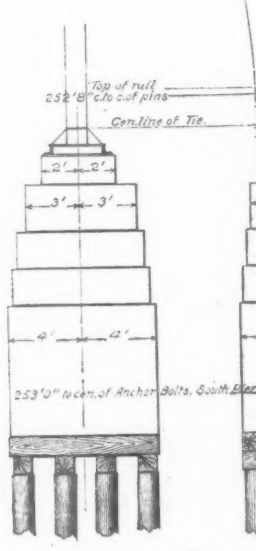
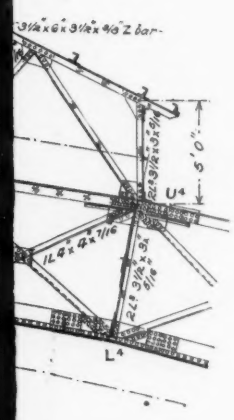


Fig. 1.



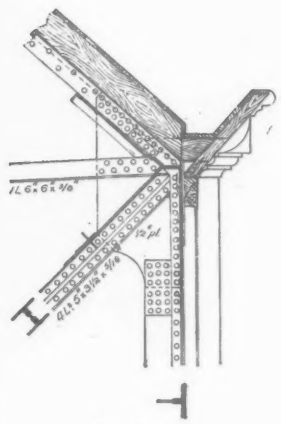
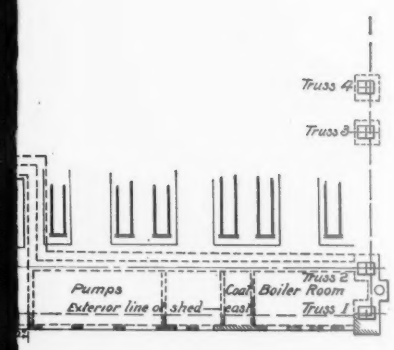


Fig. 9.



of Foundations.

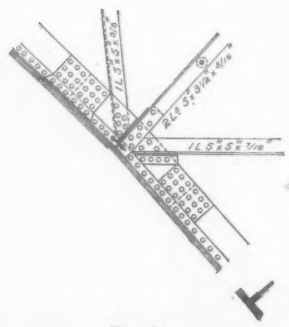


Fig. 11.

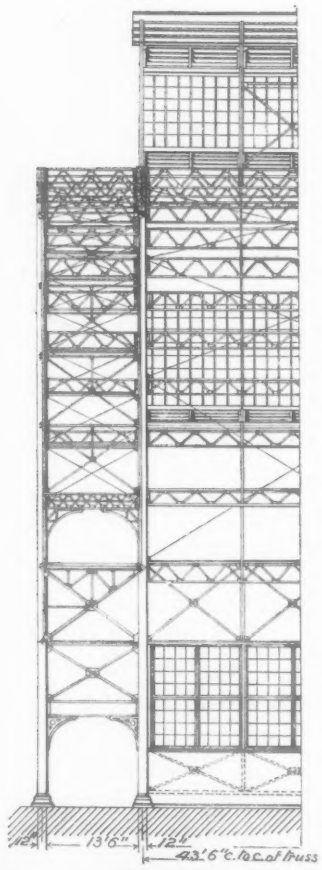


Fig. 5.

TRAINSHED OF THE PENNSYLVANIA RAILROAD OF JERSEY CITY, N. J.

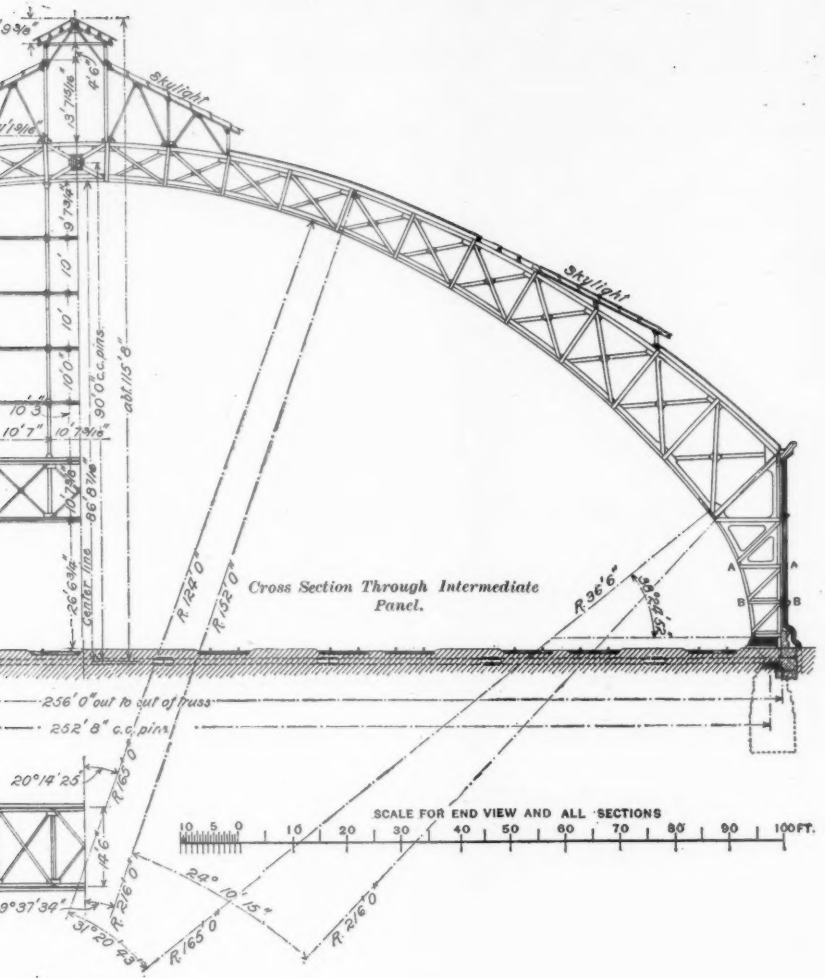


Fig. 3.

r chord, U for the upper. The numbers run down from the centre pin—the odd numbers to the left, the ght of centre; L 2 is the second, etc., down to L 22, which is the top of haunch running to eaves.

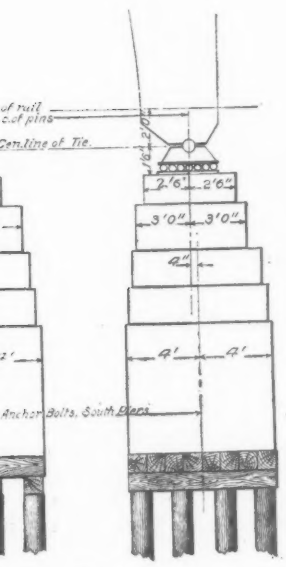


Fig. 1.

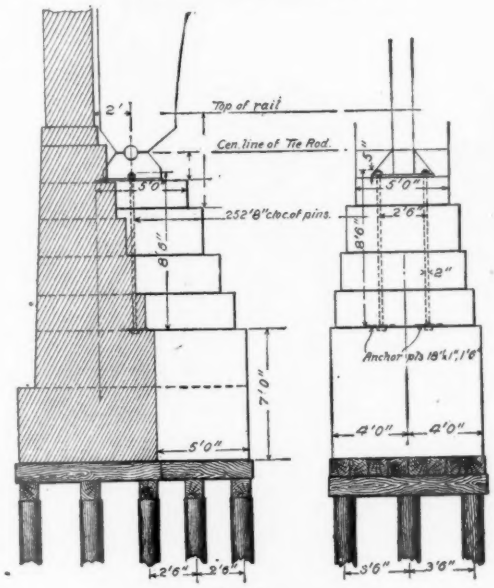


Fig. 2.

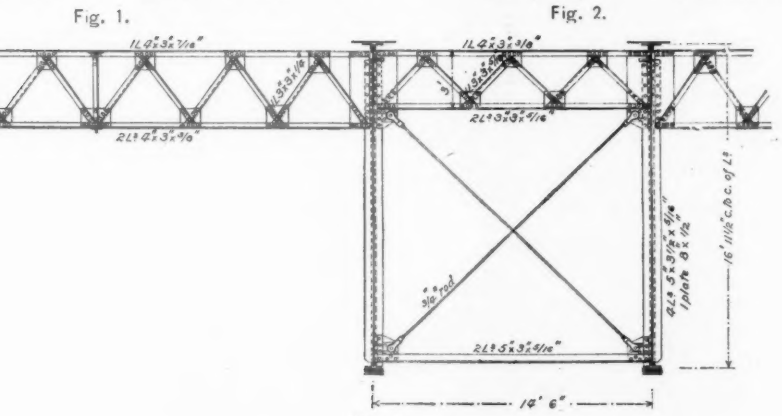


Fig. 7.

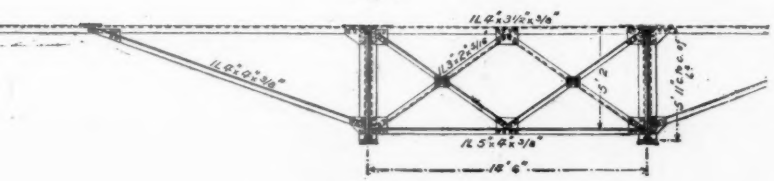
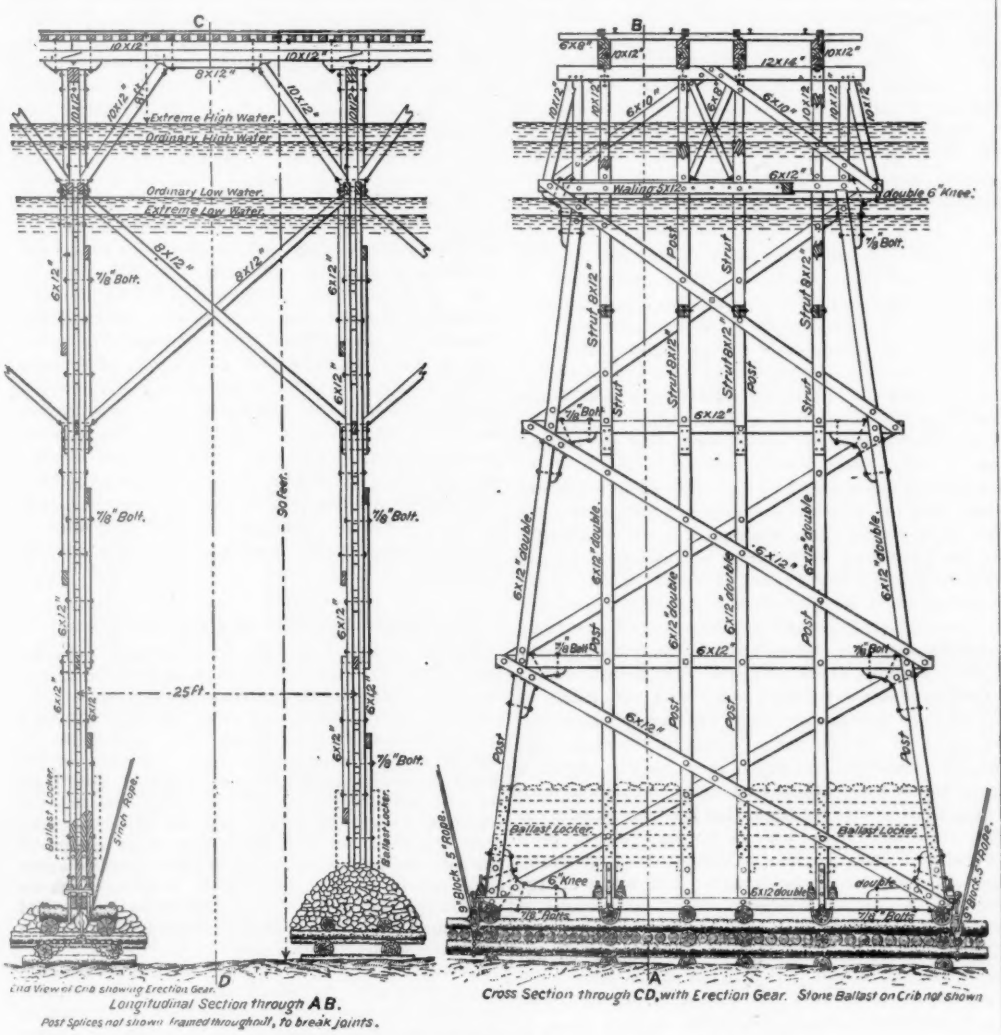


Fig. 6.

A Wreck of a Wooden Trestle.

The illustrations of the Intercolonial Railway trestle in Halifax Harbor which appear in this issue are reproduced from the *Railroad Gazette* of April 9, 1886. In that issue the bridge was described with considerable detail. The water which it crosses is from 65 to 80 ft. deep, and the mean rise and fall of the tide is 6 ft., causing a current of about 1½ miles an hour. This is sometimes increased by a spring tide and strong wind to three miles an hour. The bottom is generally of compact gravel mixed with boulders.

The construction of this trestle is very clearly shown



DEEP WATER TRESTLE—INTERCOLONIAL RAILWAY OF CANADA.

in the illustrations. The bents are spaced 25 ft. between centres, and rest on ballasted timber cribs. They were floated to place and drawn down to their positions on the cribs by the means of block and tackle made fast to the cribs.

Our reason for reproducing this illustration now is that a considerable portion of the structure was wrecked by a hurricane, accompanied by an unusually heavy tide, on the night of September 7. The wreck extends from the point 450 to 1,250, as shown on the profile. The tide was five feet higher then usual and the wind was from a quarter that exposed the bridge to the seas coming straight in from the ocean. The trestle bents, with one or two exceptions, are still standing, anchored to their foundations, as shown in the illustration. They are somewhat twisted, and in some cases the cribs are disturbed. Repairs will be made as rapidly as wind and weather permit, and it is believed that the bridge will again be passable in about two months. We are indebted for the information concerning this wreck to Mr. P. S Archibald, Chief Engineer Intercolonial Railway, who designed and built the bridge.

General Passenger and Ticket Agents' Association.

The semi-annual convention of this association was held at Old Point Comfort, Va., Sept. 15. The principal address of the occasion, delivered by Mr. James L. Taylor, of the Richmond & Danville, was given in the *Railroad Gazette* of Sept. 18.

The number of members present was 69. The committees on the subject of the more equitable adjustment of initial expenses in maintaining a complete coupon ticket representation, and on the question of abolishing unlimited tickets, made no report and were granted further time. The committee appointed to consider the question of a national basing rate sheet reported that such a sheet is desirable and necessary. The committee appointed to consider the question of discontinuing the sale of tourist tickets reported that such action would be inexpedient, and stated as the sense o the committee that the use of Thrall's round-trip excursion ticket would meet the objections to tourist tickets heretofore developed. This ticket was described in the *Railroad Gazette* of Nov. 8, 1889, and consists of a ticket and stub, both containing long columns filled up with the names of a large number of destinations, these destinations being so arranged that when the ticket is detached, by a special cutting machine, from the stub, the point to which it is sold must inevitably appear the same on both ticket and stub.

In the discussion of the report of the committee on printing tickets on face and back, which was presented at a previous meeting, it appeared that a large majority of the members present were willing to adopt the plan provided its use promised to become general. The representative of the Pennsylvania Co. asked that but one number appear in the list of numbers (as printed in the *Official Guide*) for the entire system of the Pennsylvania Co.

The communication from the Accounting Officers' Association, respecting the difficulty experienced in verifying proportions of excess baggage collections and recommending that the division of interline excess baggage rates may be made on the same proportions as lowest limited ticket rates, was made a subject for consideration at the next meeting. Mr. Martin of the "Big Four" reported that prepaid ticket business is not being generally handled under the new method recommended by the accounting officers, as seems to be generally supposed. The next meeting will be at the Hotel Del Monte, Monterey, Cal., March 15; and the orator will be Mr. T. H. Goodman, of the Southern Pacific.

TECHNICAL.

The Presidency of the International Railroad Congress.

The delegates of the International Railroad Congress, who recently met at Brussels, elected as President M. Belpaire, Director of Belgian State Railroads. He succeeds M. Albert Fassiaux, deceased.

Two Years' Imprisonment for an Engineer.

The trial of the men charged with the responsibility for the rear collision at St. Mande, France, July 26, where 34 persons were killed, was finished at Paris last week. Caron, the engineer, has been sentenced to two years' imprisonment, and De Gurrois, the station master, to four months imprisonment for negligence.

Vauclain Compounds for the Pennsylvania.

The Baldwin Locomotive Works have received orders for five class "R" engines for the Pennsylvania road to be compounded on the Vauclain system with four cylinders. This is a very important order from a business and technical point of view, as the engines will be thoroughly and conscientiously tested by the Pennsylvania men. The Baldwin people will ship the compound 10-wheeler for the Erie road this week, and they have just finished a compound motor for their own use.

The Sault Ste. Marie Canal.

The conclusion recently arrived at by the Dominion government of enlarging the dimensions of the Canadian Sault Ste. Marie Canal was discussed in committee of supply last week. When the item of $945,000 for the Sault Ste. Marie Canal came up, the acting minister, Mr. Bowell, said a change had been made in the diminsions of the lock, and in the depth from 16 ft. to 19½ ft., as against 20 ft. for the new American canal. He said that there would be an additional expenditure necessary for deepening the approaches to the upper end and also at the river end. This, however, would not be necessary until the trade of the country demanded the extra depth. It has been also decided to deepen by dredging the harbor of Port Arthur to a depth of 29 ft. The size of the new lock, he said, would be 650 ft. long, 100 ft. wide and 19½ ft. deep. The size of the American lock is 800 ft. long, 100 ft. wide and 20 ft. deep. The additional cost, which had been adopted by the government, would be for the deepening of the lock and approaches, $600,000, and deepening the harbor, $400,000, or $500,000, and the total cost, with the additional expenditure, would be within $4,000,000, if there would be no extras.

Pintsch Gas in England.

The London, Brighton & South Coast Railway has, since 1879, made considerable trial of electricity for train lighting, under circumstances rather favorable to its success, inasmuch as many of the trains of that road are run through, from one end to the other, solid. We are now informed that the company has abandoned experiments with electric lighting and has adopted the Pintsch gas system, and the whole passenger stock is now being fitted up with the Pintsch system.

The Stampede Pass Switchback.

The work has been begun of taking up the track of the switchback over the Cascades at the Stampede Pass, Northern Pacific Railroad. This somewhat remarkable temporary track was begun in August, 1886, and finished June 1, 1887. It had a total length of 7.4 miles and a total rise on the east side of 801 ft. in 3.24 miles and on the west side of 947 ft. in 3.8 miles. The heaviest grade was 295.68 ft. per mile and the sharpest curve was at 15 degrees. The plan and profile of this track and the method of operating it were very fully described in the *Railroad Gazette* of Dec. 23, 1887, and early in 1888. It was worked with two decapod engines and several consolidations. The decapods weigh 148,000 lbs. The Stampede tunnel under this pass is 9,850 ft. long. It is now being lined with brick and is lighted by 200 incandescent lamps.

American Passenger Cars in England.

The Gilbert Car Mfg. Co., of Troy, N. Y., has this week shipped by steamer to the Southeastern Railway Co. of England, a train consisting of 4 drawing room, 1 buffet and 1 baggage car. The wheels (42 in.), axles, power brake rigging (vacuum) and electric lighting apparatus, with storage battery, will be supplied in England, but all the other parts are shipped from Troy. Baker car heaters will be used. The cars have bodies 45 ft. long, and their extreme width is 8 ft. 3¾ in. The couplings and buffers are of the English type. The trucks are 4-wheel, varying little from ordinary American standards, and the wheelbase of the trucks is 8 ft. The interior of the drawing room cars shows no marked differences from American cars, the woodwork being antique quartered oak. As is well known, American drawing room and sleeping cars are already in use in England, notably on the Midland road: but the baggage car, which is of the usual American type, with two doors on each side, will be a novelty over there.

The Westinghouse Electric Motor for Street Railroads.

At the recent street railroad convention held in New York City, Mr. H. W. Grannis stated that the first motor built on the new plan by the Westinghouse Electric Company was put in operation in Pittsburgh, July 4, 1890. It was the old type, double reduction motor, with all the parts inclosed in cast iron frames. All shafting was run parallel at all times, and the gears kept in perfect alignment. The gears were inclosed in gear boxes filled with grease. This eliminated the noise and a large part of the wear and tear. That motor is still in operation. The expense for repairs has been infinitesimal. Last January a new motor was put on the market with a single reduction of speed, having the general features of the old double reduction motor. This new motor has several improvements. The resistance box has been changed, and only galvanized iron wire is now used. It is made open and is ventilated. The controlling device has been modified by making the shaft of asbestos and brass instead of wood with brass strips. This new arrangement is practically indestructible. The company is now offering two motors; a single reduction, and a gearless motor. With the last, the armature is mounted directly on the axle. The company is now furnishing generators larger than in the past. The present generators are 200 and 500 H. P.

Air Brakes.

The Chicago, Burlington & Quincy has ordered 2,000 sets of freight car brake equipment from the New York Air Brake Co.

Canada's Oil Wells.

Work has been abandoned on the first shaft sunk by the Petroleum Co. in the Crows Nest Pass, west of MacLeod, Northwest Territory. After boring 240 ft. artesian water was struck, the water flowing out of the pipe with such force that it threw up gravel and rocks. The water gave abundant indications of oil. Work on the hole could only have gone on with great difficulty, and so it was decided to remove the machinery and commence again nearer the mountains, where it is believed the bulk of the oil lies.

To Handle Ashes.

The Philadelphia & Reading Railroad Co. has arranged with the Link Belt Engineering Co. to erect at Port Richmond the necessary machinery to handle the ashes from the locomotives. An elevator will convey from under the track the ashes dumped by the locomotives, which will deliver into a storage pocket.

Cattle Guards—A Correction.

The New England Roadmasters' Association especially recommended a trial of the Common Sense Tile Surface Guard, made by Kellog, Baker & Stearns, of Garden Grove, Iowa. The report as published gave the name incorrectly. The guard is a combination of slats and pipe tiles set on end.

RAILROAD GAZETTE

Published Every Friday,
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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The Boston, Revere Beach & Lynn road has just issued a book of rules and regulations for the operating department which should have more than passing notice. It does not conform to the standard code in either style or arrangement, and this is a fault which we regard as unforgivable, even in the case of a road like this, which may lay some claim to being isolated; but its commendable features are nevertheless so marked that every manager who believes in putting his rules in the best form should get a copy of it for the numerous suggestions it offers. It contains not only the points covered by the standard code, but all the general rules usually included in such books. It is evidently all written by one hand, and that must be Superintendent Hammond's. The clearness of the language and the care taken to make each paragraph fully cover its subject are characteristic of him, and these, indeed, are the features that lead us to recommend the work as one containing matter suitable to be appropriated by other roads. It is not how to run a railroad that we are advising them to learn from Mr. Hammond, but *how to best tell their men* the details of the business. A book of this character wholly written by one person has a special value not found in one compiled by a committee. It is not always easy to point out the features in which a good specimen of the latter kind is inferior to the former, the principal one being, doubtless, the absence of important paragraphs which had to be thrown out to secure agreement; and we are not unmindful of those merits, in such a work as the Standard Code, that no one man could have produced; but yet there is a freedom and completeness in the work of a well qualified single individual that helps to make the study of the subject easier and more profitable. There are 625 rules in the book, and they are not short rules, either; but the author has not violated the principle that brevity should always be sought next after clearness. He has used more words to tell the same thing than most railroad officers would use; but he has put them together so well that the added length makes the reading easier rather than harder.

It is hardly necessary to say that we should not thus freely commend an independent work if it were simply parallel with the Standard code as issued by the American Railway Association. The merit of the main features of the Standard is so well established that no road is warranted in greatly altering them except by inserting supplementary rules. But the code of any individual road includes a large amount of other matter prepared by each road for itself, and it is in connection with these additional chapters that we urge revision and study of others' revisions. It would be a convenience to divide the code into three sections, A, B and C, as follows:

A—Rules 100 to 121. (A. R. A. Standard.)
B—Rules 200 to 499.
C—Rules 500 to 527. (A. R. A. Standard.)

The Pennsylvania fills up section B with 16 rules on block signaling and 26 others for 26 different classes of officers and employés, a rule for each class. Another prominent road puts the rules of section B at the close, beginning with number 700. The Pennsylvania's rules in this part are brief and condensed, and for those who believe that brevity is all-important or who think that they cannot spend the time required to get up a book like Mr. Hammond's, they are models. We have no quarrel with those who like the Pennsylvania's method in this matter, but simply remind those who wish to make their rules more full and explicit that there are models of both kinds, and that railroad officers who seem to be too "wordy" are not always to be avoided as idle dreamers. To embody all the printed instructions for a section master in a single "rule" of eight short paragraphs, as is done in the Pennsylvania code, is to admit in advance that much remains to be told the man in some other shape; and the only practical question about putting this additional matter in print, in the very best form, is, Will the ideas be more thoroughly and effectually conveyed to the section master's mind than if imparted orally by the division roadmaster or by random circulars? For any one who will take the trouble to get the instructions read, there is little doubt about the answer.

A General Manager suggests the theory that the very hot weather during the latter part of summer, which is often so oppressive for days at a time that trainmen and others, especially night workers, cannot get sufficient sleep, is accountable for the large number of train accidents at this season; and he thinks he has facts to prove it. He has read the long record of collisions and derailments in August, printed in the *Railroad Gazette* last week, and admits that he had his share of them; and believes his investigation of the cases that came under his notice shows reasonable evidence that unavoidable relaxation or prostration of the nerves, from the cause suggested, is to be accepted as the immediate explanation of numerous acts of carelessness and negligence. It would be interesting to know the views of other managers on this question. In general terms the proposition is a sound one, being based on the same premises as the familiar arguments against working excessive hours. But these last mentioned arguments, though forcible and convincing as far as mere logic is concerned, are rarely susceptible of proof in specific cases. There are so many men who are somewhat dull *before* they have worked too long, and so many others who make no serious mistakes, even when very tired, that it is very difficult to fit the theory to the facts, and do it with precision. The August accident record generally has an unfavorable appearance, but some of the increase in numbers is to be expected, on account of the increase of business, necessitating more trains. This, however, does not explain why August should show more accidents than July, as it has done every year but one since 1872. Is mountain, seashore and excursion travel always heavier in August than in July? Probably it is, but the difference can hardly be relied on to alone account for the larger accident record, whereas the trying conditions of weather, even if no worse in August than in July, could be expected to produce more marked effects because of the long-continued strain. We print below a list showing the total number of accidents by months for four years. May and June show smaller totals than the Winter and Spring month, by reason of the more favorable weather, and smaller than the later months, because of smaller business. We await the views of our readers concerning the extent to which our correspondent's theory affects the matter.

NUMBER OF TRAIN ACCIDENTS BY MONTHS AS REPORTED IN THE RAILROAD GAZETTE.

	1887.	1888.	1889.	1890.	1891.
January	140	239	124	171	211
February	132	174	117	128	196
March	117	172	101	171	212
April	90	136	96	135	181
May	83	145	102	129	166
June	88	143	79	137	167
July	117	157	143	149	169
August	137	222	169	178	223
September	150	128	132	254	.....
October	117	146	190	283	.....
November	125	145	151	204	.....
December	182	136	168	207	.....
	1,478	1,943	1,572	2,146	.....

The column of railroad law in this issue has a variety of interesting suggestions for operating officers. A lawsuit is generally the culmination of a more or less desperate contest, and the facts exhibited by it are therefore, *prima facie*, of importance. The issues being important, cognizance must be taken of every small detail, and the arguments often seem petty, but the questions prove to be far-reaching, nevertheless; and the recurrence of the same difficulties in a slightly changed form only illustrates how universal is the necessity for re-teaching old lessons. The twentieth case this week is one that should be heeded. The man on the engine doubtless performed his duty as faithfully as could be expected of an engineer or conductor, and the Court's opinion may at first sight seem unjust; but it is not. The real negligence was in having an unmuffled pop-valve. It is good to have judges who will punish this crime, although they may not employ the best reasoning in arriving at their conclusions. The Texas judge who decided the 14th case will meet the approval of those railroad officers who decline to build cars with strong frames to withstand the shocks of derailment, on the ground that their sole legitimate aim should be to build cars that will behave well while on the rails. That Texas road avoided paying the engineer by arguing that rotten sleepers were the proper thing; but in discussing among themselves the cost of rerailing and repairing the engine, a bill which could not be avoided, we have no doubt that the officers took the more rational view that the use of sleepers which are in such a condition as to aggravate a derailment is *not* justifiable. The 21st case is an instance of a sublime kind of audacity that has to be rebuked anew every month or two somewhere. The railroad lawyer's scrap book must have a very large humorous department. The 12th and 13th cases go well with the one just mentioned to fill up that department. The 25th case again shows the more serious side of railroading. When one must resign if he would not execute a vicious, unjust or dangerous order from a superior he is in a trying dilemma; and yet this comes to railroad men in many grades oftener than they are wont to admit. In fact the adoption of ideal ethics would precipitate many thousand resignations the first day. But though it is seldom that we see an exhibition of the courage necessary to take the highest course in this matter it is to be hoped that the exigencies of "Wall street methods" in railroad operating are not killing it out.

The Conduit System for Electric Railroads.

Street railroad men are too ready to believe that an electric conduit system for conveying current to motors on cars is impracticable. The reason for this is clear. The cost of a conduit system will not be far from $30,000 a mile, while a good overhead trolley system can be erected for less than $5,000. At the meeting of the Street Railway Association of the State of New York recently, held in New York City, the President made the statement that the public generally was objecting to the trolley system, but they must accept that system, as without the poles and overhead wires electric roads could not be made a commercial success. Such an opinion is biased by the fact that the cable roads would be stronger competitors if the cost of the electric systems was increased by $25,000 a mile.

Among the best engineers, both electrical and mechanical, there is a decided opinion that no difficulty would be experienced that would be the equivalent of the difficulties now had with cable roads if a conduit system were properly constructed. The experience of the city of Boston on the West End Railroad is often cited as an example of the impracticability of electric conduits of this sort, but we are by no means sure that the West End experiment was necessarily a failuee. It was understood by many that the West End experiment was purposely made a failure in order to prevent the Boston city government from demanding that all lines inside of the crowded portions of the city should be laid on the conduit system. A decision to this effect was at first reached by the city government, but had to be withdrawn owing to what seemed to be the impossibility of constructing a successful conduit system, as shown by the West End experiments.

Electric companies as a rule have but little to say about conduit systems, but they all, when cornered, admit the probability of a successful one being devised. In fact, we are informed on reliable authority that one or two cable roads expect to change their motive power shortly and will use heavy electric conductors placed in the conduits, with a collector much less complicated and not unlike the grip of a cable car.

The insulation is the only question which might arise in the mind of a mechanical or civil engineer in connection with the conduit system. The mechanical devices themselves are much simpler than those used for cable roads. Insulation is always a difficult manner, but mainly because the funds available are too small to enable the best insulation to be used. There is little doubt that the addition of a few thousand dollars a mile to the cost would settle at once the insulation question for conduit systems. It has been hinted that the construction of the Broadway cable conduit is suspiciously well adapted for electric conductors, and there are those who think it doubtful if a cable is ever run within it. The experience of Chicago with cables in crowded districts gives ground for the general belief that street railroad companies are becoming a little dissatisfied with cables and would gladly consider a change from a cable to electricity if sufficient encouragement was given them by electric companies. In any city, such as St. Paul, where electric motors and cables are used on parallel lines, the comparison reflects on the commercial efficiency of the cable. In that city a comparatively new cable system is

to be removed and electric motors with overhead wires substituted.

The limitations of a cable are many, but the most important one is that brought by the initial power required to move the empty cable. For instance, in Chicago the cost of running the empty cable is so great that after twelve o'clock at night the entire cable systems shut down, and do not commence operation again until six in the morning. Meantime, over long distances belated passengers have to travel in slow old-fashioned horse cars. Owing to the difficulty of keeping sufficient horse power on hand, the cars are run only at long intervals, say of about half an hour, and the inconvenience to the public and the loss to the street railroad companies are considerable. By actual measurement it has been shown that it requires from 300 to 500 horse power to move some of the Chicago cables without a car; hence, with half an hour interval between cars there would only be two or three cars on the entire line at one time, and the average horse power devoted to each would be about 100 where it should be only about 1½ horse power. With the electric system this limitation is not found. The power is not taken unless the cars are running, and only the amount necessary to propel the car is used unless there be serious leakages on the line. Leakage is not necessary, as shown from the experience of the West End Company in Boston. With an electric system the cars can be run at a comparative low cost at any time, night or day, and it costs but little more to run one car by itself than to run the full equipment at one time; hence, there is no necessity for the use of horses when the traffic is light, as is the case with cables. In proposing cables for elevated roads, this difficulty of the initial cost to operate a single car on the line has always been found to be insurmountable, and the faster the cable the greater is the difficulty, as not only is the horse power required to move the cable increased, but there are less cars in operation upon the line at any one time.

The advantages of electricity and the lack of any positive proof that a conduit system is impracticable leads us to believe that the time is not far distant when a successful electrical conduit system for street railroads will be in operation in this country. The feeling in Chicago is strong against over head wires in the streets, and all telephone and telegraph wires in the heart of the city are placed in conduits, hence for these and other reasons we may look to that city for the first experiment on a large scale of the conduit system for street railroads.

Proportions of Cylinders for Compound Locomotives.

In another column we give data from a comparative test made on the Western New York & Pennsylvania with two engines; one simple and one compounded on the Vauclain system. The tests were under the supervision of the General Master Mechanic of the road, Mr. Vail, and the report was made by him. The conditions were identical, and so far as can be seen from this writing the results are the most conclusive that we have yet published. The average saving in favor of the compound is about 37 per cent., part of which is due to the better action of the blast on the fire. A study of the data leads to some interesting conclusions. It is noticeable that with the compound engine there was considerably less vacuum in the smokebox needed to blow the fires, and the temperature of the smokebox was, as might be expected, less with the lesser vacuum.

In the *Railroad Gazette* Sept. 18 we called attention to the variation noticeable in the capacities of the low pressure cylinders of the compound locomotives built in this country. This engine offers another instance of this variation and, to more forcibly call attention to the current practice in this particular, we have prepared the following table showing the comparative cylinder capacities of different compounds for different classes of service, taking into consideration the diameter of drivers and the weight thereon.

The comparative figure we have used is termed 'volume of low pressure piston displacement per foot of track, per ton on drivers." It is the cylinder volume or piston displacement which is used per foot of advance of the locomotive for each ton on drivers. It is found by dividing the total volume of the low pressure cylinder or cylinders by the product of one-half the circumference of the drivers in feet and the number of tons on drivers. This is one way of comparing the relative low pressure cylinder capacities of compound locomotives.

It will be seen from the above table that there is too much variation to permit one to say that all of these proportions are correct. Some must be nearer the best than others. Possibly the larger low pressure cylinders in proportion to the work to be done are too large, but this remains to be proved. Certainly the smaller proportions are much too small. This relation of low pressure cylinder capacity to the work to be done per stroke is undoubtedly the most important feature of compounding which the Master Mechanics' Association Committee will have to report upon, as it is not to be expected that engines with such wide variations in proportion will work with equal economy. There has been some, and there will be more, argument offered to show that the large cylinders given in this table are so great as to give too much turning moment, and induce more slipping of the drivers than is permissible; but, on the other hand, it may be stated that these engines with large cylinders have been working very satisfactorily in the hands of careful engineers. It is too early yet to reach a conclusion as to the practical limit of cylinder capacity for compounds; the theoretical limit has probably not been exceeded by any of the designs mentioned in the table.

COMPARATIVE CYLINDER CAPACITIES OF COMPOUND LOCOMOTIVES.

By whom operated or built.	Type of engine.	Diameter of low pressure cylinder—inches.	Diameter of high pressure cylinder—inches.	Length of stroke.	Diameter of drivers—inches.	Weight on drivers—tons.	Volume of low pressure piston displacement per foot of track per ton on drivers. A comparative figure.	Remarks.
Pennsylvania R. R.	Webb	30	14	24	75	33.4	.....	3 cyl., no parallel rods, express.
Northern of France	Wolff	26	15	25.6	51.2	56.9	71.2	4 cyl. tandem freight.
Saxon State R. R.	Lindner	25.6	18.1	24	55.6	29	58.8	2 cyl. freight.
Saxon State R. R.	Lindner	23.6	16.5	22.1	75	32	30.8	2 cyl. express.
Saxon State R. R.	Lindner	25.6	16.5	22.1	75	32	36.2	2 cyl. express.
Paris, Lyons & Med.	4 cyl	19.7	12.2	24.4	78.7	32.5	44.4	4 cyl. express.
Paris, Lyons & Med.	4 cyl	21.3	13 4	25.6	59	62.5	38.0	4 cyl. freight.
Paris, Lyons & Med.	4 cyl	21.3	14.2	25.6	49 5	63 0	44 4	4 cyl freight.
Michigan Central	Schenectady	29	20	24	68	48.5	35.8	10 wheel express, 2 cylinders.
B. & O	Vauclain	20	12	24	66	37.8	46.0	8 wheel freight, 4 cylinders.
Michigan Central	Schenectady	29	20	24	74	49 5	32.8	10 wheel express, 2 cylinders.
Brooklyn Elevated	Rhode Island	18	11½	15	42	15.8	46.8	Forney elevated. 2 cylinders.
Decauville	Mallet, articulated	11	7.4	10.2	23 6	12.9	48 4	Freight, 4 cylinders.
Herault	Mallet, articulated	18.1	12.1	20.5	47.2	38.5	44.0	Freight, 4 cylinders.
Central Suisse	Mallet, articulated	21.7	14	25.2	55.1	65.0	40.0	Freight, 4 cylinders.
Gothard	Mallet, articulated	22.8	15.8	25.2	48.4	93.7	34.4	Freight, 4 cylinders
Vladikavkaz	Lindner	28	19⅝	25 9/16	47¼	49.9	50.8	Freight, 2 cylinders.
Northern Pacific	Vauclain	19	11	24	56	45.0	41.2	Consol. freight, 4 cyl.
Bahia Exten., Brazil.	Vauclain	15	9	18	37	26.5	49.6	Freight, 4 cylinders.
Mexican Central	Johnstone	{24¼ / 3 to 1}	14	24	48	50.0	70 4	10 wheeler freight, annular cylinders, 4 cylinders.
Mexican Central	Johnstone	{3 to 1 / 24¼}	14	24	56	52.5	57.6	10 wheeler freight, annular cylinders, 4 cylinders.
New South Wales.	Vauclain	23	13½	26	51	61.5	48.0	10 wheel express, 4 cylinders.
Southern Pacific	Schenectady	28	20	26	55	49 8	44.6	10 wheel freight, 2 cylinders.
Northeast, England	Worsdell	28	20	24	91¼	18.5	66.6	Single driver express, 2 cyl.
West. N. Y. & Penn.	Vauclain	21	13	26	50¼	58.2	47.2	10 wheeler freight, 4 cylinders.
C., B. & Q.	Lindner	29	20	24	68	45.8	38.8	Class "H" Mogul, express, cylinders
Old Colony	Dean	28	20	24	69	33.2	49.0	8 wheeler, 2 cylinders.

The Nebraska Report.

The decision of the Secretaries of the Board of Transportation of Nebraska, communicated to the Board on Sept. 18th and indorsed by that body, deserves notice and hearty approval. Under the somewhat cumbersome plan adopted in Nebraska, the board is composed of state officers to whom a report is made by selected men called secretaries. These three secretaries held meetings at various towns throughout Nebraska and invited all complainants against existing railroad tariffs to appear and state their cases. Railroad men also were present, so that grievances were closely examined as to each individual matter and as affecting the welfare of the state at large.

In their report, made after many hearings and arguments, the secretaries find that "rates now in force in this state cannot be reduced without doing violence to the business interests of the state." As to the question of profits, the secretaries assume $30,000 per mile as the average cost of Nebraska railroads, and find that on this basis (not regarding the capitalization actually issued as stock or bonds), the roads earned very small profits; the profits of the Burlington being put at .046 per cent., the Rock Island lines at .021, the Omaha at .044, and the Northwestern lines at .027. The Nebraska earnings were estimated by taking such a proportion of the total earnings as the Nebraska mileage bore to the total; giving a result only valuable as an illustration.

But upon the main point of the rate question as affecting the welfare of the whole state, the secretaries are unquestionably sound. It is that Nebraska sells her products and buys her supplies in distant markets, hence what concerns Nebraska farmers deeply is the long haul rate. What matters it that the tariff on corn between local stations is high when little or none is so carried? What figure does 10 cents per hundred cut in the price of dry goods distributed from a jobbing center? Railroad men did well to combat such talk on the part of professional agitators by statements showing the retail prices of goods to be as low in Nebraska as in Iowa. On the other hand, the researches of the secretaries showed that the through rates on corn from Nebraska points to Chicago were, per ton mile, lower than from Iowa points—comparison with Iowa being a stock argument against the railroads. Thus, corn from Hastings, Neb., to Chicago is 23 cents per 100 lbs. or about seven-tenths of a cent per ton per mile for carriage 626 miles. From Murray, Ia., to Chicago, 365 miles, the rate is 17 cents, or about 1 cent per ton per mile. To have their corn put on the Chicago market at a lower rate in proportion to distance than the corn of places nearer to that city is certainly all that Nebraska farmers could ask, and even more. This important point the secretaries emphasize by examples of cost of carriage for hogs, cattle and grain, all showing an advantage to Nebraska judged by a mileage standard. It is more than hinted that Iowa and other competing states would gladly see local rates in Nebraska reduced, and Chicago rates advanced, so that Iowa products would be free from competition with those of Nebraska.

So sensible, so clearly argured and so plain a business proposition as this ought to be and perhaps will be accepted by the Nebraska farmers as settling the railroad rate question in that state for a long time to come. The demagogues have had a rather long day in Nebraska and the secretaries in reporting and the Board of Transportation in accepting their report, have, it is to be hoped, shown us the dawning of a day of reason and common sense, not to be dimmed by any cloud o dust which anti-railroad agitators can raise.

Report of the Government Directors of the Union Pacific.

In view of the present complicated condition of Union Pacific affairs, the report of the five government directors, just filed with the Secretary of the Interior, has more than usual interest. The fact that last year the gross earnings of the Union Pacific increased three and a half millions while the expenses of operating increased five millions is, the directors say, due to the exceedingly low rates. However much the states and territories reached by the system may be benefited by a competition tending to such results, the ultimate effect upon the financial stability of the corporation, if continued, cannot be doubted.

Of the $20,000,000 of the gross floating debt $15,000,000 represents advances to auxilliary roads or expenditures for branch road stock for purpose of control. A plan is now about consummated in Wall street to issue three years' notes for the purpose of paying off this floating debt, the notes to be secured by the hypothecation of *all* the bonds and stocks of proprietary or auxilliary roads, now in the Union Pacific treasury. This should be noted to understand what the directors have further to say.

"We have no hesitation in saying that the policy of the Union Pacific in acquiring control of tributary lines is absolutely necessary to the prosperity of the system. It may be doubted if the company could have maintained its solvency except through such a policy. The time was when the Union Pacific commanded at remunerative rates the whole business of the country tributary to it, but now not only the transcontinental traffic, but that of every state and territory through which it runs is divided between many competitors. To have maintained a policy of passive submission would have been voluntary assent to the bankruptcy of the system. However much the policy of securing tributary lines has at times embarassed the company, and while the terms and conditions upon which some have been acquired might be open to discussion, the policy as a whole has been an imperative necessity. We believe that the lien of the government, through that policy, has been vastly more valuable, and its security has been enhanced."

Everyone familiar with Union Pacific traffic and finances will agree with the government directors in saying that "the policy (of building branch lines) as a whole has been an imperative necessity." During the investigation of 1887 the Comptroller of the company gave the committee careful statements showing that one-third of the gross earnings of the main lines were derived from traffic originating on or destined to the connecting roads in the system. The net earnings are dependent in even larger proportion upon branch line business, for Union Pacific officers asserted that at least 60 per cent. of the gross earnings from such interchanged traffic was net gain. Turning to any one of the later Union Pacific reports, a brief calculation will show that if the main lines were to be stripped of this third of their earnings, they could pay interest on the first mortgage but nothing on the second mortgage held by the Federal government.

What, therefore, is the effect upon the security of the government in giving over to the holders of the floating debt the practical title to all the bonds and stocks of auxiliary roads in the Union Pacific treasury? The effect is unquestionably to impair that security and thus to bring into strong relief the fact long known to the

few but not realized by the many, that the Federal government cannot expect to be paid principal and interest in full. This being so and the wisdom and justice of a compromise being conceded, why should not the government conform to the situation. The committee reports as follows upon this subject:

"The conditions prevailing at this time emphasize the recommendation so often made by the Congressional committees and by government directors. No one can come into a close knowledge of the Union Pacific Rail way system without being impressed with the necessity for relief from the exactions and limitations now imposed by law. It is vitally essential that this company should be freed from these to enable it to maintain itself in fair competition with other systems not so hampered and restricted. The whole financial system of the Union Pacific Railway in its relations with auxiliary or tributary roads is one of expedients rendered necessary by the limitations of various statutes having in view the security of the government lien. But the complex and involved methods arising from branch guaranteed collateral trust and indorsed bonds has cost the company a vast amount of money, fairly stated in millions, which might have been in a large degree saved if it had been permitted to issue its own direct obligation, secured by direct mortgage upon its own property. We cannot perceive that the government is in any way benefited by these limitations, or that the security of its own lien would be in the least impaired by their removal. Their only effect seems to be to add to the burden of the company in ordinary financial administration, and to that extent to impair its ability to meet the demands upon it.

"A sound public policy should, in our judgment, prompt the government as a creditor to make such provision as to time and date of payment of the principal and the rate of interest to be paid, as may be within the ability of the company to meet, and just and equitable under all the circumstances; but having done this the Union Pacific should be as free and untrammeled as other lines to develop and extend its system. The ability of the company to discharge its obligations to the government and the public would be materially enhanced, and ultimate payment more certainly secured, by such legislation as will permit of a consolidation and unification of the system, and an extension of the security of the government, either directly or indirectly, to the whole property."

As the matter now stands, the trustees of the floating debt, having control of all except the main lines of the Union Pacific, are in a position to enforce the repayment of the whole $20,000,000 (to be increased to $24,000,000 if necessary) against any other creditor of the company, be it the Federal government or any other mortgagee, in case a readjustment of Union Pacific capitalization should for any reason be necessary. These floating debt notes of the Union Pacific run for three years, to September, 1894; the first government mortgage comes due one year later; the underlying bonds also reach maturity in the near future. The falling due consequently of these mortgages and debts aggregating one hundred millions of dollars seems to the directors to be a fact not to be overlooked. It indeed means that a settlement of Union Pacific affairs must be soon attempted either by negotiation and Congressional action or by a receivership, if everything else fails.

An officer of the Baltimore & Ohio writes to us that the report printed in our accident record last week of a derailment near Landenburg, Pa., on Aug. 12, is wholly unfounded, no accident of any kind having happened in that locality. He adds that some other accidents on that road in August are exaggerated. We are glad, of course, to correct every erroneous statement, and take this occasion to thank those numerous railroad officers who have sent us correct accounts of train accidents happening on their respective roads. We regret every inadvertence by which we have failed to squeeze out the "gas" from the reports received at this office, but at the same time would remind some of our correspondents (not this one) that there is no good to be attained by making reports so brief as to be misleading. The reporters of the press indulge in a great deal too much blood curdling rhetoric, especially over wrecks which they have not seen; but the adroitness in the use of language that is displayed by some railroad officers in pruning away this rhetoric is worthy to be classed as genius. We throw away bushels of this verbal sawdust every month, but some of our correspondents make us ashamed of our skill as condensers. One letter received not long ago calls to mind the boy who dropped the basket of eggs on the way home from the store. He did not make a direct answer to the question whether he had broken them, but admitted that "the shells came off from some of 'em"!

We are glad to note that the Master Mechanics' Association Committee on Compound Locomotives is now taking active steps to proceed with the investigation. Every facility will be offered to the committee by the locomotive builders. The Baldwin people will have an engine ready for it in thirty days. This is such an important subject and one which will consume so much time, both in collecting data and making the report, that necessarily an early start must be made in order that a report may be ready next year. It is important for the good of all concerned that a report be made at the next meeting, as there is every indication that a large number of compounds will be built soon. The value of a report, such as we have a right to expect from this committee, can hardly be overestimated.

Train wrecker Barraud was sentenced at Belvidere, N. J., on Tuesday to ten years' imprisonment and a fine of $1,000. At the same time a young colored man, William Jackson, who pleaded guilty to placing obstructions on the track of the Pennsylvania, received the same punishment, which is the extreme penalty of the law. Jackson gave as his reason a desire to get even with the company for putting him off a train for non-payment of fare. Another instance of swift justice is reported from Indiana, Charles Howard, who tried to wreck the Pennsylvania limited express near Whiting, Ind., Sept. 14, having been sentenced just one week afterward to ten years in the penitentiary. An officer of the road writes us that on examination Howard was so completely cornered that he broke down, confessed that he was the only one implicated in the matter and pleaded guilty.

NEW PUBLICATIONS.

Master Car Builders' Association. Report of the Twenty-fifth Annual Convention. June, 1891. John W. Cloud, Secretary, The Rookery, Chicago, Ill.

Some of the 1891 reports of the Association are of fresh and unusual interest. Among these are the report and the discussion on brake-shoe metal. The reader will remember that the work of this committee was never carried out according to the original programme, owing to the time and expense involved. Nevertheless, some information of a good deal of value was collected and is now presented as a progress report, which makes a useful starting point for future investigation. The report on air brake standards also is an important step in the evolution of a new subject which must be settled before long.

Messrs. John Wiley & Sons announce as in preparation *Modern Locomotive Construction*, by J. G. A. Meyer.

TECHNICAL.

Manufacturing and Business.

The following companies have this week been chartered in Illinois: The Lindsley Terminal Equipment Co., of Chicago, to manufacture railroad equipments; capital stock, $100,000; incorporators, P. S. Grosscup, F. L. Wean and H. R. Pebbles. The Martin Car Coupler Co., of Chicago, to manufacture car couplers; capital stock, $1,000,000; incorporators, Alexander C. Martin, Flavius J. Barber and J. M. Corrigan.

The Montreal Nut Lock Co. has been incorporated. The capital stock will be $100,000.

Moorehead, McCleane & Co., the embarrased iron firm of Pittsburgh, have been granted an extension of five years by their creditors. The liabilities, which are about $1,400,000, will be paid in instalments of 10 per cent. the first year, 15 per cent. the second year, and 25 per cent. the last three years. The plant is in full operation.

The Electric Merchandise Co., Chicago, reports the closing of contracts last week for the complete equipment of electric roads at Defiance, O., and Negaunee and Ishpeming, Mich. During the same period, orders are reported for the Burton electric heater from roads in Amsterdam, N.Y.; West Superior, Wis.; Milwaukee, Wis.; Escanaba, Mich.; Defiance, O.; Dallas, Texas; Newton, Mass.; Champaign, Ill.; Helena, Mont.; and Ann Arbor, Mich.

The Berlin Iron Bridge Co., of East Berlin, Conn., on Saturday last shipped by a special train to New York 23 car loads of iron building material for the Companhia Nacional de Fogas e Estaleiros, Rio de Janeiro, Brazil, S. A. (National Iron & Shipbuilding Co.). This shipment is one of the largest single shipments that ever passed through New England, the combined weight of the 23 cars being nearly 1,000,000 lbs. The iron is to be lightered aboard a Brazilian steamer from the Harlem River station and shipped direct to Rio de Janeiro. The material is for building for a car works for the Companhia Nacional de Fogas e Estaleiros. The tools and machinery for the entire equipment are also to be furnished from this country.

The Osgood Dredge Co. is building one of its dredges on a car with narrow gauge trucks for the United States Government for use on the proving grounds at Sandy Hook.

New Stations and Shops.

The Pittsburgh, Wheeling & Kentucky Railroad has a very inadequate passenger station at Wheeling, W. Va., and has been making an effort for several years to improve it. The company has prepared a plan for a station that will cost $50,000, but it has not purchased the ground on which to build. The present station is so located that unless the new one is placed in an entirely different part of town, a part of the public wharf will have to be occupied. A petition for the right to use an unused part of the wharf was denied at the last meeting of the city council. The company is very much hampered for room, and is confronted with a serious situation. They are against a high bluff which cannot be removed on account of the presence of a street on the one side and almost in the river on the other. It is the intention now to remove the passenger department to some other part of the town.

The Wheeling Bridge & Terminal Co. last week let the contract for a new freight house and office building in Wheeling, W. Va., to Paige, Carey & Co. The building will be located on the bank of Wheeling Creek, and will be two stories high, 180 ft. x 60 ft., and will be built of brick.

The new Union Station in Louisville at Tenth street and Broadway, which has just been opened has been building for two years. The building is larger than any other station in the south and it is one of the largest and most complete stations in the west. It was built at a cost of $300,000, the heating apparatus alone costing over $50,000. The heating pipes are so arranged that cold air can be pumped through them when necessary. The dome in the main hallway is regarded as being particularly fine, and is covered in part with stained glass. The walls are frescoed, and the floors are laid in encaustic tiling, laid in figures. The trains on the Louisville & Nashville, the Monon and the Pennsylvania lines are now running into the new station. Six of the Pennsylvania and six of the Monon trains will leave this station daily. It is likely that the trains on the Air line will also use the Union station.

The Philadelphia & Reading is building in Philadelphia two new freight stations at Front and Willow streets. The incoming freight house will have a front on Front street of 46½ ft. and a depth along Margaretta street of 241 ft. The other house, which is for outgoing freight, has a front on Front street of 62 ft. and a depth along Willow street of 175 ft., narrowing at the rear end. Between the two buildings is a space of about 50 ft., on which five tracks will be laid. The houses will be set back 21 ft. from the street curb lines, to enable wagons to load and discharge. The structures will be of brick and one story high. The interior will receive its light from transoms over the numerous doors with which they are supplied. Cofrode & Evans are the general contractors.

Among the contemplated improvements by the Northern Pacific at Ocosta, Wash., are a station and freight house to cost $10,000, and also repair shops and a round-house. It is reported that the Northern Pacific will also erect docks and coal bunkers at Ocosta.

The new Edison shops of the Northern Pacific, adjoining the city of Tacoma, are likely to go into operation this or next week. These are machine shops and have been described in these columes.

Light Railroads in Ireland.

There are certain lines of railroad now being built in Ireland under Government subvention, partly with the purpose of permanently bettering the condition of the country, and partly to afford employment. Among these is the West Cary Railway, which is briefly described in a recent issue of *Industries*. This is a branch of the Great Southern & Western Railway of Ireland, and is built on the 5 ft. 3 in., Irish gauge. It is about 27 miles long, with maximum gradients of 1 in 50, and minimum curves of 10 chains radius. The material for excavation and embankment is largely handled by country carts, as speed and economy of construction are not primary objects in a line built partly to give employment to the people. The road is being laid with flange rails weighing 65 lbs. per yard. They are set with an inclination toward the centre line of 1 in 20.

Track Jacks.

The dreadful accident on the Old Colony in 1890, when 23 lives were lost, because a track jack could not be removed from the track in time to prevent a derailment, called attention to an element of danger which probably had never had much attention before from the higher officers, and, in fact, had never been sufficiently appreciated by the roadmasters themselves. The jack at once jumped into prominence, and the qualities of the various designs were examined as they never had been before. The Roadmasters' Association of America appointed a committee to investigate the subject and make a special report. The report of that committee was made at the Minneapolis Convention and adopted by the Association. The report was printed in our issue of Sept. 19. Briefly, it describes with great accuracy the Barrett jack, and so far as we know no other jack fills *all* the requirements of the report. The requirements are for a double acting, compound lever jack that can raise or lower its load a half notch at the will of the operator, that is *positive* in its action, and that can be released instantly. There are other requirements as to weight, lift, etc., but these are the essential ones.

THE SCRAP HEAP.

Notes.

The Canadian River has suddenly risen again and 600 ft. of the Santa Fe track is reported washed away south of Purcell, I. T. The damage done is at the same place as a few months ago, but is said to be more extensive than before.

The engine repair shops belonging to the Quebec & Lake St. John road at St. Raymond, Que., were destroyed by fire last week. Three engines which were off their wheels undergoing repairs in the shop were badly damaged. The loss is covered by insurance.

The Mississippi River has been so low at Memphis that the transfer boats of the Kansas City, Fort Scott & Memphis were unable to run, and freight was seriously delayed several days. A new landing with an "incline" track had to be built at West Memphis, the worst difficulty having been caused by sandbars close to the landing.

The Kansas State Board of Railroad Commissioners, after making a tour of inspection of the Lawrence and Burlington branches of the Atchison, Topeka & Santa Fe, has ordered the company to relay the track from Lawrence to Ottawa and from Ottawa to Burlington, substituting steel for the iron rails, which have been in use for 20 years.

Press dispatches report serious forest fires and a few cases of loss of life in Minnesota and Wisconsin the latter part of last week. The reports come from a large extent of country, many villages along the lines of the St. Paul & Duluth and the Chicago, St. Paul, Minneapolis & Omaha being endangered. All the reports are, however, indefinite.

A collision between an express and a mixed train on the railroad between Burgos and San Sebastian, Spain, Sept. 24, resulted in the death of 24 and the injury of 20 persons. It is said that the collision was due to the blunder of a telegraph operator, though it appears to have occurred at a station. The accounts state that the government had heretofore ordered the railroad company to abolish the Breguet system of telegraph and adopt a more modern apparatus.

The Chattanooga *Times* says that the famous locomotive "General," for the capture of which the Andrews raiders were executed, and which is the best-known engine in the world, will be sold at auction with a dozen similar ones by the Nashville, Chattanooga & St. Louis the present lessee of the Western & Atlantic. Numerous offers have been made to lease the "General," but President Thomas announces that the engines will be advertised for sale within the next thirty days to the highest bidder.

A small party of passengers in a special car arrived in New York over the New York Central on Monday last, having come from San Francisco in 4 days, 12 hours and 28 minutes, by regular trains. They came via Ogden and Omaha and the Chicago, Burlington & Quincy to Chicago, and thence over the Lake Shore, their car being attached to the fast mail trains the whole distance. This is the quickest trip that has ever been made across the continent by passengers on regular trains, although a similar journey was made a few weeks ago in about 109 hours.

A Successful Strike.

At Jersey City last week 38 women employed to clean Pullman cars were ordered by their boss to clean the cuspidors also. They refused and quit work. During the

afternoon the officer countermanded the order, and the women resumed their work. The cuspidors will be cared for by the same employés that previously attended to them.

Canadian Railroad Subsidies.

A return has just been laid before the Dominion Parliament showing the amount of subsidies voted by the Dominion Parliament since Confederation in 1867. It shows that the total amount of subsidies voted has been $31,615,491 on a mileage of 4,236¾ miles. Divided by provinces the figures are:

Province.	Mileage.	Sum Paid.
Ontario	1,397¾	$7,000,506
Quebec	2,060¾	11,419,507
New Brunswick	469¼	2,784,383
Nova Scotia	383½	7,464,273
Prince Edward Island	6	9,600
British Columbia	157	1,025,209
Northwest Territory	.....	2,310,000

Association of Bridge Supervisors.

Bridge superintendents to the number of thirty from different railroads throughout the country met last week in St. Louis to take steps toward organizing an association. O. J. Travis, of the Iowa Central road, issued a circular letter June 25, and the responses have been many and favorable. Among those present at St. Louis were G. M. Reid, Lake Shore & Michigan Southern; O. J. Travis, Iowa Central; A. S. Markley, Chicago & Eastern Illinois; J. H. Markley, Toledo, Peoria & Western; G. W. Markley, C. B. Keller, O. McNab, Joseph Doll and George Schite, of the C. C. C. & St. L.; Joseph De Mars, Wheeling & Lake Erie; G. W. Turner, St. L. & S. F.; A. McNab, Chicago & West Michigan; A. J. Kelley, Jacksonville & Southeastern; E. Hanks, Flint & Pierre Marquette; W. A. McGonagle, Duluth & Iron Range; J. B. Mitchell; H. A. Hanson, C. C. C. & St. L.; James Stanard, Wabash; C. W. McGooch, Des Moines & Northern; W. R. Damon, Louisville, Evansville & St. Louis; H. M. Hall and B. F. Bond, Ohio & Mississippi; G. W. Hinan, Louisville & Nashville; J. A. Nicholson, Quincy, Omaha & Kansas City; J. E. Wallace, Wabash; J. O. Thorn, C., B. & Q.

H. M. Hall was chosen temporary chairman. The name will probably be the National Association of Superintendents of Bridges and Buildings of the Railroads of the United States.

The Teutonic Breaks a Record.

The White Star Line steamer Teutonic, from New York, Sept. 23, for Liverpool, arrived at Queenstown at 1:50 P. M., Sept. 29, breaking the eastward record. The time occupied on the passage, according to the report given by the Teutonic's officers, was 5 d. 21 h. and 22 min., which is 1 h. and 28 min. better than any previous record. About two weeks ago the City of New York took the eastern record, which had been held for some time by the City of Paris. This voyage makes the Teutonic the holder of the record for both the eastward and westward voyages. The Teutonic left New York in a fog.

A South African Railroad.

Arrangements have been concluded in Paris by the "Mozambique Company" for the construction of the Beira (or Pungwé) railroad. It will run from the port of Beira to the British South African Company's frontier at Massi Kesse. An early commencement of the work is looked for.

LOCOMOTIVE BUILDING.

The Norfolk & Western will soon let contracts for 25 locomotives.

One of the ship canal engines for the Chignecto Railroad has been completed by the Kingston Locomotive Works, and left the works to be stored in the Kingston & Pembroke Railroad roundhouse until needed. A second engine will be finished this week. The other two will not be ready for service until spring.

Twenty-nine locomotives are now building for the Chesapeake & Ohio, and will be delivered before the end of the year. Nineteen are building at the Schenectady and 10 at the Richmond Locomotive Works. The greater number of them are 10-wheelers, but several are consolidation engines, and there are three or four 6-wheeled switchers.

The Buffalo, Rochester & Pittsburgh has ordered from the Baldwin Locomotive Works six new engines, four to be consolidation freight locomotives, with cylinders 20 × 24 in. and 52-in. drivers. Two of these engines will be compound. The other two will be of the American passenger type, with cylinders 18 × 24 in. and 68-in. driving wheels.

The Michigan Central is building five passenger engines at its Jackson shops and two have just been commenced in the St. Thomas shops. The engines are 10-wheelers, equipped with outside equalized driver air brakes. They have 19 × 24 in. cylinders, with drivers 68 in. in diameter; the weight on drivers is 94,000 lbs., the total weight of engine between 118,000 and 200,000 lbs. The locomotives are similar to a number built at the Schenectady Locomotive Works, and the boilers for the engines now building were made at those works.

CAR BUILDING.

The Buffalo, Rochester & Pittsburgh has recently let contracts for 400 freight cars of 60,000 lbs. capacity. Of these, 100 are to be box cars and 300 hopper-bottom gondola.

The Michigan Central has just completed at its St. Thomas shops an order for 110 platform cars for the road. All light cars returned for general repairs are being broken up and replaced by cars of 60,000 lbs. capacity, with air brakes and M.C.B. couplers. At the Detroit shops an average of one passenger car is being built a month.

The North Carolina Car Co., of Raleigh, N. C., is building 300 freight cars for the Seaboard Air Line.

The Chicago & Alton has recently ordered 30 new chair cars.

The Lake Shore & Michigan Southern is building four new postal cars, two at Cleveland and two at Adrian. The cars will be 60 ft. long and will be unusually strong. Iron plates are being used to strengthen the end sills and the interior of the cars and the the end frames are being re-enforced by iron bars. At the Buffalo shops four cabooses and a new baggage car are being built.

The Pullman Car Co. has just completed at its works a train of 15 new cars for the Baltimore & Ohio to run between Baltimore and Cincinnati, the first of an order given by the Baltimore & Ohio and the Baltimore & Ohio Southwestern. The cars are vestibuled and in construction are similar to those running on the Royal Blue Line.

The Maine Central is building 12 new cabooses at its shops at Waterville, Me.

BRIDGE BUILDING.

Atlanta, Ga.—The Bridge Committee of the City Council of Atlanta has let the contract for the masonry for the Forsyth street bridge to W. R. Maher, for $15,954. The iron work will probably be awarded to the Phenix Iron Works.

Baltimore, Md.—The City Council has passed a resolution to appropriate $35,000 for the construction of a bridge over Jones Falls, on Lexington street.

Bennings, D. C.—The award of the contract for the Highway bridge near Bennings to A. D. Neald was noticed last week. The bidders furnished their own plans, and the successful one is described as follows: The bridge consists of an iron superstructure supported by iron posts resting on masonry below the water level, the whole on a foundation of wooden piles. The length of the new bridge is 500 ft., divided into twenty spans of 25 ft. each. The roadway is 24 ft. wide in the clear, with 5-ft. sidewalks on each side. A handsome railing with lamp posts at 100 ft. intervals completes the structure. The roadway and sidewalks are of asphalt.

Camden County, N. J.—The Bridge Committee of the Camden County Board of Freeholders has condemned the bridge over Cooper's Creek at Federal street. The structure will be repaired and an appropriation will probably be asked for a new bridge.

Charlottesville, N. C.—The Chamber of Commerce has recently received a bill from S. Widdkoosky, proposing the building of a bridge across the Catawba River, at two or more points, connecting Mecklenburgh County with York, Lincoln and Gaston counties.

Choccolocco, Ala.—A contract has been awarded to Frank Morris, of Choccolocco, Ala., for the construction of a bridge across the Choccolocco creek, near this place.

Duluth, Minn.—The St. Paul & Duluth and the city officials of Duluth have finally signed the contract whereby the former has agreed to pay $50,000 for constructing a steel viaduct across its right of way on Lake avenue by the city of Duluth, payable as the work proceeds.

Memphis, Tenn.—The consideration of the bids recently submitted for an iron bridge at Mill street has been postponed by the Common Council until the city engineer has completed plans and estimates for a stone arch for the bridge. The bridge is to be 145 ft. long from centre to centre.

Milledgeville, Ga.—G. H. Crafts & Co., of Atlanta, Ga., have been awarded a contract to construct an iron bridge over Fishing Creek, near Milledgeville, Ga., and work has been commenced.

Mt. Morris, N. Y.—The new bridge of the Western New York & Pennsylvania, over the Genesee River at Mt. Morris, has been opened for traffic. It is an iron structure of three spans, each 138 ft. long, resting 38 ft. above the river. It was built by the Union Bridge Co.

New York City.—A meeting of the sub-committee of the Committees on Consolidation of the New York & New Jersey Bridge Co. was held Sept. 30 to revise the consolidation papers and prepare them for the full committee. The members said that the work was making rapid progress, and the work of construction would soon begin. At the meeting were Judge George W. Green, Charles H. Swan and H. D. Archer, for the New York side, and James T. Sparkman, W. F. Forster and R. Floyd Clark, for the New Jersey side.

Ottawa, Can.—In the supplementary estimates, in addition to the $20,000 voted by the Dominion Parliament for the Oliver's Ferry Bridge, $16,000 has been appropriated for repairs to the dam at Hog's Back and $7,000 for a bridge at Merrickville. All these works are on the Redeau Canal.

Philadelphia.—In the Philadelphia Common Council this week bills were introduced to appropriate $35,000 for a bridge on the line of Seventeenth street, over the connecting railroad, and to provide for its construction. Also for the construction of a bridge on the line of Seventeenth street, over the Philadelphia, Germantown & Chestnut Hill Railroad, and to authorize the construction of a bridge on the line of Manayunk avenue.

Sioux City, Ia.—The State Railroad Commissioners have approved the plans for a 40-ft. viaduct with a 10-ft. sidewalk on each side to be constructed on lower Fourth avenue by the Illinois Central and the Chicago, St. Paul, Minneapolis & Omaha. The City Council will probably build the viaduct 52 ft. wide with 14-ft. sidewalks, the expense above the cost of the 40-ft. structure to be paid by the city.

Williams County, Ky.—A contract has been awarded the Chicago Bridge & Iron Co., of Chicago, for constructing 12 iron bridges in Williamson County, Ky., at a total cost of $45,500.

Winnipeg, Man.—Work has commenced on the new bridge over the Red River at Winnipeg. It will be constructed at the foot of Main street, south, a short distance from the Assiniboine River in Fort Rouge. Captain Robinson has the contract for the bridge.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Indiana an ordinance granting a railroad company the right to build its road in a street provided that the company should grade the street, and that "the line of the railroad shall be located so as not to approach the sidewalk curb-stone nearer than 15 ft." The Supreme Court rules that the words, "line of the railroad," did not mean the extreme limit, including ties and grade, or the centre or thread of the track, but referred to the rails, they being the only part of the road raised above the grade of the street.[1]

The Supreme Court of the United States decides that under a contract by which a sleeping car company was to place a designated number of its cars at the disposal of a railroad company, the latter to be liable for damages to them from accident or casualty while they were on its road or in its shops being repaired, the railroad is liable for destruction of a car by fire while standing in its yard to be cleaned and made ready for another trip. But where a sleeping car company became dissatisfied with the manner in which repairs were being made on its cars by the railroad to which it had leased them, and undertook itself to make such repairs, in a shop set apart to it by the railroad company for that purpose, over which it was given exclusive control, and to which the railroad company's agents had no access, a car which for six months has been undergoing repairs in such repair shop is not in the possession or under the control of the railroad company; and the latter is not liable for its loss by an accidental fire therein, under an agreement to be responsible from accident or casualty.[2]

In Vermont the corporation tax law imposes a tax upon the entire gross earnings of all railroads operated in the state, and provides (section 14) that, when a railroad is operated under a lease, the tax shall be paid by the lessee. The Supreme Court rules that the tax being imposed on the "gross earnings," to be paid by the lessee if the road is leased, and deducted from the rent, is a tax upon the gross earnings of the lessor's road; and it is the lessor's duty, in the absence of contract, to ultimately pay the tax.[3]

The Supreme Court of the United States decides that under the Tennessee statute granting the railroad company incorporated by that act power to borrow money to complete its road and secure it by mortgage, this power to mortgage is exhausted on the completion of the road, and hence no contract is violated by the law of 1877, which was passed after such completion, and provides that no railroad company shall have power to create a mortgage which shall be valid against certain classes of judgments therein enumerated.[4]

In the Federal Court it is ruled that a debt created for materials for original construction of a portion of a railroad more than six months before the appointment of a receiver in proceedings for the foreclosure of a mortgage is not within the rule authorizing the court to provide for arrears due for operating expenses of the road out of the net income of the property, and, in the absence of a showing that there had been a diversion of current funds or income which should have been applied to the payment of the claim for such materials, will not be given a priority over the rights of the mortgage creditors.[5]

In Illinois the Supreme Court holds that road taxes levied in a district through which a railroad runs are not a lien on railroad property lying within the county, but outside the district.[6]

The Supreme Court of Georgia rules that the provisions of the Code that when a railroad is intended to be built between two points where a railroad is now constructed, the general direction and location of such new railrood shall be at least 10 miles from the railroad already constructed, does not prevent the building of a railroad within less than 10 miles of a railroad in process of construction, but not completed.[7]

In the Federal Court it is held that a claim against a railroad company for causing the death of plaintiff's intestate is a demand arising from a failure of duty, and could not by its creation benefit, preserve, or increase the *corpus* of the estate of the company, and is not entitled to priority upon the foreclosure of a mortgage thereof.[8]

Injuries to Passengers, Employes and Strangers.

In the Federal Court it is held that a sleeping car company has the right to sell a whole section to one person, and no cause of action arises from the refusal of its conductor to sell the upper berth in such section to another passenger, though that berth was in fact unoccupied. And where a berth is occupied to a certain point the conductor is not obliged to sell it for a point beyond until after the former point has been passed.[9]

In New York the Court of Appeals rules that a passenger who is injured while attempting, by direction of the conductor, to board a moving train while in such proximity to a raised platform as to render the consequences of a misstep possibly serious, is guilty of contributory negligence, even though the train is not moving faster than one or two miles an hour.[10]

And in Pennsylvania it is held that a passenger who is injured while getting off a train while in motion, after he has been warned not to do so by other passengers, cannot recover.[11]

The Supreme Court of Arkansas rules that one who entered a train, expecting and desiring to be ejected in order that he might bring a suit for damages, cannot recover for wounded feelings and pain of mind.[12]

And in Georgia it is laid down that a passenger who has been wrongfully expelled from a railroad train is not entitled to recover damages for the injury that resulted to his health from his walking to his destination, when he had the money and the opportunity to ride thither.[13]

In Texas it is laid down by the Supreme Court that the ties in a railroad track being strong enough to support the engine and cars as long as they remain on the rails, no inference of negligence can be drawn from the fact that, after an engine leaves the rails, it is turned over, and the engineer injured by reason of some of the ties being old and rotten.[14]

In Arkansas the superintendent of car repairs in a certain yard complained of the violation of the rule prohibiting switching on the repair tracks without permission from the foreman of repairs. The yard master was ordered to enforce this rule, and to have the cars on the repair tracks moved at a stated hour each day. At that hour he sent a switchman and engineer with an engine to move cars under direction of the foreman of repairs, who ordered them to move certain cars, and warned them against going upon the track where deceased was working under a jacked-up car. Soon after the switchman threw the switch, and without warning deceased he caused a train of cars to be backed against the car, which fell and killed him. The Supreme Court holds that the company was liable, since the injury was not an ordinary risk of the employment.[15]

In Virginia the Supreme Court rules that a fireman employed by a railroad only by the trip, who, while off duty, lounges near the track, and, heedless of the danger, puts himself in such a position that a passing train must strike him, is guilty of such negligence as will prevent his recovery for injuries sustained by being struck while in such position.[16]

In Massachusetts the plaintiff, a brakeman in defendant's yard, was instructed to set two brakes on a moving train of platform cars, and for that purpose stood on the brake beams between two cars. Finding that he could not set one of the brakes, he swung out to alight for the purpose of setting another brake, struck a pile of ties near the track and, slipping thereon, was injured. There was no evidence that before he jumped he looked in the direction in which the train was moving, or took any other precaution to avoid obstructions on the roadbed, but it appeared that, from where he stood between the loaded cars, he was unable to see obstructions which might be ahead or dangerously near the track. Plaintiff had knowledge of the custom of the defendant in piling ties near the tracks. The Supreme Court decides, even admitting negligence in defendant, that plaintiff was guilty of contributory negligence in jumping from the moving train when he could not see where he was to alight.[17]

In Louisiana, an engine was running backward through a town. The brakeman was in the tender, but

not at the end which was advancing. A child was seen on the track by by-standers, who raised an alarm. The brakeman rushed to the front of the tender, jumped down, and tried in vain to save the child. The engine was reversed, but it did not stop in time. The Supreme Court rules that the brakeman should have been at the end of the tender keeping a lookout, and that the railroad is liable.[18]

In Virginia, the plaintiff drove over a crossing immediately after a passing engine had cleared the track for him. The engine proceeded some 35 or 40 ft. from the crossing, where it was coupled to a box-car, the engineer watching plaintiff until he had safely crossed the track. The engine was then reversed, and started backward toward the crossing, when plaintiff's horse took frignt, and, unobserved by the engineer, backed the wagon against the tender. The Court of Appeals holds, in an action for the injuries sustained by plaintiff, that, as there was no evidence showing want of care on the part of the railroad employés, it was error to charge that the company was bound to exercise special prudence and caution to avoid injury to persons or their property traversing the highway at the crossing.[19]

In New York the plaintiff in a buggy approached by a converging road defendant's railroad crossing, occupied by cars, which were being shifted. The engine and cars moved down near to plaintiff and stopped. Plaintiff called out: "Is it all right so we can go ahead?" Defendant's servant on the engine replied: "All right; go ahead." Plaintiff moved forward, and, when abreast of the engine, steam began to escape from its pop value and several "toots" of the whistle sounded, frightening plaintiff's horse, and causing it to spring sideways into a ditch, throwing plaintiff from the buggy, and breaking his leg. It appeared that the pop was not under control of the engineer. The Supreme Court holds that, although there was no evidence of negligence in the operation of the engine, the assurance of safety was made to plaintiff without reservation, and implied the control of the engineer over the engine and its instruments of alarming sounds, and that defendant was liable for plaintiff's injuries received in acting upon that assurance.[20]

The Supreme Court of Illinois rules that negligently omitting to whistle or ring a bell when approaching a crossing, as required by statute, does not render the company liable to a farmer who is plowing in his field near the crossing, and who is injured through his horses taking fright at the train, since the statutory requirement is only intended for the benefit of travelers on the highway.[21]

In Alabama the Supreme Court rules that the obstruction of a public crossing by a railroad train, thereby preventing plaintiff from driving across for more than half an hour, does not render the company liable for injuries to plaintiff caused by the fact that at the expiration of that time his horse became frightened and ran away at the approach of a second engine and train, as the fright of the horse is only the remote consequence of the obstruction of the crossing.[22]

In the same state it is held that one, who, to give access to his hotel, constructs a bridge on the land of a railroad company and turns it over to the company for its use, is not liable for personal injuries caused by a defect in the bridge due to the company's failure to repair it.[23]

In a case in the Federal Court the defendant owned certain mines and a short line of railroad. The plaintiff's husband worked in the mines, and for a month he had gone to and from his work on a railroad velocipede. He was killed through the collision of the velocipede with a car. The court decides that if the velocipede was used on the railroad without the consent of the defendant, or if it merely acquiesced in its use, or if it consented to its use by plaintiff's husband at his own risk, the defendant was not liable unless it was guilty of willful negligence.[24]

The Supreme Judicial Court of Massachusetts holds that a conductor who, without protest, while another train is overdue and expected from the opposite direction, starts out with his train in violation of the rules of his company, with which he is familiar, shows want of due care, which will preclude his recovery for injuries to himself in a collision, though he may be acting under the negligent orders of his superior officer, whom he is bound to obey or lose his position.[25]

In Indiana the Supreme Court rules that it is not the duty of a brakeman to know whether the brakes on the train on which he is working are in good condition, or to examine them before using them.[26]

[1] C., St. L. & P. R. Co. v. Eisert, 26 N. E. Rep., 759.
[2] C., St. L. & N. O. R. Co. v. Pullman South. Car Co., 11 S. Ct. Rep., 490.
[3] V. & C. R. Co. v. V. Cent. R. Co., 21 Atl. Rep., 262.
[4] E. T. V. & G. Ry. Co. v. Frazier, 11 S. Ct. Rep., 517.
[5] Amer. Loan & Trust Co. v. East & West R. Co., 46 Fed. Rep., 101.
[6] Wabash Ry. Co. v. People, 27 N. E. Rep., 456.
[7] Macon & A. R. Co. v. Macon & D. R. Co., 13 S. E. Rep., 157.
[8] Farmers' Loan & Trust Co. v. Green Bay, W. & St. P. Ry. Co., 45 Fed. Rep., 664.
[9] Searles v. Mann Boudoir Car Co., 45 Fed. Rep., 330.
[10] Hunter vs. C. & S. V. R. Co., 25 N. E. Rep., 958.
[11] Kilpatrick v. Pennsylvania R. Co., 21 Atl., Rep. 408.
[12] St. L. & S. F. Ry. Co. v. Trimble, 15 S. W. Rep., 899.
[13] G. R. & B. Co. v. Eskew, 12 S. E. Rep., 1061.
[14] Ward v. Bonner, 15 S. W. Rep., 805.
[15] St. Louis, A. & T. Ry. Co. v. Triplett, 15 S. W. Rep. 831.
[16] Moore v. N. & W. R. Co., 12 S. E. Rep., 968.
[17] Thompson v. B. & M. R. Co., 26 N. E. Rep., 1,070.
[18] Hamilton v. M., L. & T. R. & S. Co., 8 South. Rep., 581.
[19] R. & D. R. Co. v. Yeamans, 12 S. E. Rep., 860.
[20] Keech v. R. O. & W. R. Co., 13 N. Y. S., 149.
[21] Williams v. Chicago & A. R. Co., 26 N. E. Rep., 661.
[22] Stanton v. Louisville & N. R. Co., 8 South Rep., 798.
[23] Watson v. E. T. V. & G. R. Co., 8 South. Rep., 770.
[24] Craig v. Mount Carbon Co., 45 Fed. Rep., 448.
[25] Wescott v. N. Y. & N. E. R. Co., 27 N. E. Rep., 10.
[26] O. & M. R. Co., v. Pearcy, 27 N. E. Rep., 479.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Cumberland Valley, quarterly, 2 per cent., payable Oct. 1.

Delaware, Lackawanna & Western, quarterly, 1¾ per cent., payable Oct. 20.

Georgia, quarterly, 2¾ per cent., payable Oct. 15.

Long Island, quarterly, 1¼ per cent., payable, Nov. 2.

New Castle & Beaver Valley, quarterly, 2½ per cent., payable Oct. 1.

New York Central & Hudson River, quarterly, 1 per cent., payable Oct. 15.

New York & New England, semi-annual, 3½ per cent., payable Nov. 1.

New York, New Haven & Hartford, quarterly, 2½ per cent., payable Oct. 1.

Pittsburgh, Fort Wayne & Chicago, quarterly, 1¾ per cent., payable Oct. 6; and special, quarterly, 1¾ per cent., payable Oct. 1.

Pittsburgh, Youngstown & Ashtabula, 3 per cent. on the common stock, and 3½ per cent. on the preferred stock, both payable on demand.

Utica & Black River, 3½ per cent., payable Sept. 30.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Annapolis & Baltimore Short Line, annual, Clifford's, Md., Oct. 14.

Atchison, Topeka & Santa Fe, annual, Topeka, Kan., Oct. 29.

Baltimore & Ohio Southwestern, annual, Cincinnati, O., Oct. 14.

Charleston, Cincinnati & Chicago, annual, Charleston, S. C., Oct. 8.

Chesapeake & Ohio, annual, Richmond, Va., Oct. 27.

Cincinnati, Jackson & Mackinaw, annual, Van Wert, O., Oct. 7.

Cincinnati, New Orleans & Texas Pacific, annual, Cincinnati, O., Oct. 19.

Cleveland, Cincinnati, Chicago & St. Louis, annual, Cincinnati, O., Oct. 28

Cincinnati, Sandusky & Cleveland, annual, Sandusky, O., Oct. 21.

Cumberland Valley, annual, Harrisburg, Pa., Oct. 5.

Denver & Rio Grande, annual, Denver, Col., Oct. 20.

Erie & Huron, special, Sarnia, Ont., Oct. 13, for the purpose of passing a by-law to establish the head office of the company at Toronto, Ont.

Evansville & Terre Haute, annual, Evansville, Ind., Oct. 19.

Franklin & Tilton, annual, Concord, N. H., Oct. 13.

Lake Erie & Western, annual, Bloomington, Ill., Oct. 7.

Louisville, Evansville & St. Louis Consolidated, annual, Belleville, Ill., Oct. 15.

Louisville & Nashville, annual, Louisville, Ky., Oct. 7.

Louisville, New Orleans & Texas, annual, Memphis, Tenn., Oct. 5.

Milwaukee & Northern, annual, Milwaukee, Wis., Oct. 6.

Minneapolis & St. Louis, annual, Minneapolis, Minn., Oct. 8.

Montreal & Ottawa, special, Montreal, P. Que., Oct. 9.

New York, Pennsylvania & Ohio, annual, 30 Euclid avenue, Cleveland, O., Oct. 14.

Northern Pacific, annual, Mills Building, New York City, Oct. 15.

Peoria, Decatur & Evansville, annual, Peoria, Ill., Oct. 6.

Restigouche & Victoria special, for purpose of organization, Campbellton, N. B., Oct. 15.

St. Louis & San Francisco, annual, Broadway and Pine street, St. Louis, Mo., Oct. 27.

St. Paul & Duluth, annual, St. Paul, Minn., Oct. 8.

Seaboard & Roanoke, annual, Portsmouth, Va., Oct. 6.

Western Maryland, annual, Baltimore, Md., Oct. 21.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Society of Railroad Superintendents* will hold its annual meeting in New York City, Oct. 12.

The *American Railway Association* (*Time Convention*) will hold its fall meeting in New York City, Oct. 14.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* will hold its next meeting at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in September.

The *Southern Railway Club* holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* hold regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* hold regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

American Society of Railroad Superintendents.

Secretary C. A. Hammond announces that the twentieth meeting of the society will be held at Hotel Brunswick, Fifth Avenue and Twenty-sixth Street, New York City, on Monday, October 12, at 10:30 a. m.

The principal business comes in the following order:

Amendments to the constitution proposed at last meeting.

Report of executive committee, President H. S. Goodwin, chairman.

Reports of standing committees: on roadway, J. B. Morford, chairman; on machinery, G. W. Beach, chairman; on transportation, F. K. Huger, chairman.

Report of special committee on signaling, J. J. Turner, chairman.

Address by Mr. Willard A. Smith, Chief Department of Transportation Exhibits, World's Columbian Exposition, on "Railroad History and Plans for representing Transportation Interests at the World's Fair."

Paper by Mr. W. G. Wattson on Economy in Train Service.

Topics for discussion: (*a*) Experience in working under the standard code; (*b*) Methods of examining and instructing employés; (*c*) Block signaling; (*d*) Practical tests of railroad appliances.

A cordial invitation is extended to all railroad superintendents, past and present, to attend this meeting, and, if not members, to present their application for membership.

Civil Engineers' Club of Cleveland, O.

A regular meeting was held on Tuesday evening, Sept. 9, with President Gobeille in the chair and 18 members present. The secretary being absent, Mr. C. M. Barber was chosen secretary, *pro tem.* The minutes of the last meeting were read and approved. Mr. Henry A. Barren and Perry L. Nobbs were elected active members.

It was voted to have visiting days, when the members of the club in a body will visit the different manufacturing establishments of Cleveland and engineering works in the vicinity, and a permanent committee was appointed to designate the days and arrange programmes.

President Gobeille then read an interesting paper entitled "Straw and Corn on the Cob as Fuel for Domestic Purposes," in which it was stated that it had been found from experiments that the same quantity of heat could be generated by the combustion of straw or corn on the cob, pound for pound, as could be generated by any other fuel. One of the principal difficulties in designing stoves for burning straw is to provide for the liquid products of combustion, which are comparatively large in quantity.

Several drawings of different stoves, designed for burning straw were exhibited, also diagrams showing temperature curves obtained by platting calorimeter and pyrometer readings from experiments recently made. The difficulties of burning lignite, and the need of stoves suitable for burning this material, which abounds in many parts of the country destitute of true coals, were also discussed. The result of ten experiments were platted against lines derived from similar treatment of bituminous coal.

Engineers' Club of Philadelphia.

The first fall meeting will be held on Saturday evening, Oct. 3, at the Club House, 1,122 Girard street. The subject for the evening is "Power Transmission," and a paper on "Land-Locked Navigation Through the Bays and Inlets of the Atlantic Coast" is also expected.

Early in the year the club was practically reorganized, a new constitution and by-laws being adopted, by which many of the duties which heretofore have devolved upon the secretary were transferred to the several committees of the Board of Directors. Since then the Publication Committee has issued several numbers of the club proceedings, thereby nearly extinguishing the twelve months of arrears in which it found the publication.

The Committee on Information and Entertainment has kept itself in touch with the membership, and has done much to increase the interest in the meetings. For that of May 16, the committee selected the subject of Rapid Transit, a burning question in Philadelphia just now, and the result was one of the largest and most animated meetings the club has held.

Shortly after assuming its duties, the present board of Directors took up the question of incorporation, and upon its recommendation the club unanimously directed that the necessary steps be taken for this purpose. A. J. Rudderow, Esq., attorney-at-law, associate member of the club, promptly drew up a form of charter and brought the matter before the proper court.

New England Railroad Club.

The regular meeting of the club will be held at the United States Hotel, Boston, Wednesday, Oct. 14, at 7:30 p. m. The subject for discussion is the "Lighting of Passenger Cars."

Securities Listed on the New York Stock Exchange.

The following securities have been listed at the New York Stock Exchange:

Illinois Central.—Additional issue of capital stock, $1,500,000, making total amount listed $43,595,400.

Colorado Fuel Co.—Preferred stock, $1,034,200, and common stock, $1,551,300.

Louisville & Nashville.—Additional issue of unified 50-year 4 per cent. gold bonds, $2,500,000, making total amount listed, $7,250,000.

Louisville, St. Louis & Texas.—Additional issue of capital stock, $560,000, making total amount listed $3,000,000; also $250,000 second mortgage 6 per cent. gold bonds.

Southern and Southwestern Railway Club.

The Southern and Southwestern Railway Club met at Nashville Sept. 24 with 30 members present. President Marshall exhibited designs for a vestibuled stock train. The breaking of locomotive side rods and draft rigging for freight cars was then discussed, after which officers for the next year were elected, as follows: President, Capt. R. D. Wade; First Vice-President, James Meehan; Second Vice-President, Pulaski Leeds. The club will meet in Atlanta in November.

PERSONAL.

—Mr. Thomas Kearsley, Master Mechanic of the Elmira, Cortland & Northern, resigned last week.

—Mr. H. C. McKelvey has resigned as Division Master Mechanic of the St. Louis, Iron Mountain & Southern, to accept a similar position with another company.

— Mr. William H. Hackett, a well known lawyer in New England, died at Boston, Sept. 24, aged 63 years. Mr. Hackett was a director of the Concord & Portsmouth road and for 40 years Clerk of the Corporation, and was also a director of the Eastern Massachusetts.

—Mr. Emmons Blaine is has entered the service of the Baltimore & Ohio as General Agent, with headquarters at Chicago. Mr. Blaine resided in that city several years as General Freight Agent of the Chicago, Santa Fé & California. He was for a short time assistant to the President of the West Virginia Central & Pittsburgh.

ELECTIONS AND APPOINTMENTS.

Atlantic & North Carolina.—At the annual meeting in Morehead City, N. C., last week, W. S. Chadwick was re-elected President of the road.

Baltimore & Ohio.—Emmons Blaine has been appointed General Agent of this company for Chicago and the Northwest. He will be the authorized representative of the executive department of the company and will report directly to the President. His office will be in the Rookery Building, Chicago.

Big Horn Valley.—The incorporators are William W. Dudley, Richmond, Ind.; Edward W. Davidson, Baltimore; Louis T. Michener, of Indiana; C. B. Crane and Newman F. Howe, New York; James W. Hobart, St. Albans, Vt.; Carrol T. Hobart, Red Bank, N. J., and John T. Sinclair, Philadelphia.

Calumet & Blue Island.—M. M. Richey has been appointed Superintendent of the Company.

Central of Georgia.—W. O. Charlton, Jr., Assistant Master Mechanic at Savannah, has been appointed Master Mechanic of the Chattanooga & Griffin Division, with headquarters at Cedartown, Ga.

Charleston, Cincinnati & Chicago.—E. P. Waring has been appointed Acting General Freight and Passenger Agent of this company, vice S. B. Pickens, deceased.

Eagle's Mere.—The directors of this Pennsylvania road, referred to last week, are: Andrew J. Maloney, President; Joel S. Bailey, Earnest L. Shaffer, Howard U. Davis, William H. T. Reeves, B. Harvey Welch and Henry F. Jatho, all of Philadelphia.

Fairhaven & Southern.—The company has been reorganized by the proprietory line, the Great Northern, and the following directors have been elected: J. J. Hill, W. P. Clough, C. X. Larrabee, W. P. Strader and H. Y. Thompson; President, C. X. Larrabee, and Secretary, H. Y. Thompson.

Flint & Pere Marquette.—J. H. Huston, Special Agent of the Pittsburgh & Lake Erie, has been appointed Car Accountant of this road, with beadquarters at Saginaw, Mich. He succeeds J. H. Woolacott, who has held the position for nearly 20 years.

Florida, Georgia & Carolina.—The following directors were elected for the Georgia Division at the meeting at Milledgeville, Ga., last week: Augustius Dupont, C. E. Frazier, G. W. Lee, Wilkinson County, Ga.; D. B. Sanford, J. C. Whittaker, Baldwin County; William M. Reese and T. B. Green, Wilcox County; J. D. Maynard, Mr. Fuller, Taliaferro County; W. O. Mitchel, Berrien County; H. P. Peeples, Twiggs County; Hon. Wimberly and J. S. Vaughn, Hancock County; Hon. F. H. Little and R. O. Graves.

Florida, Georgia & Western.—Frank Damon has been appointed Chief Engineer of the road, with headquarters at Tallahassee, Fla., vice Capt. John M. Cook, resigned.

Houston & Texas Central.—The jurisdiction of G. A. Quinlan, Chief Engineer and General Superintendent, has been extended over the Waco & Northwestern from Bremond to Ross. For operating purposes this road will be attached to the second division of the Houston & Texas Central. L. A. Duffau is Division Superintendent at Ennis, Tex.

Iron Range & Huron Bay.—The officers of the company are: C. H. Buhl, President and Henry Stephens, Vice-President, Detroit; and Frank L. Dodge, Secretary, Lansing, Mich.

Kansas City, Arkansas & New Orleans.—The incorporators of the reorganized company are: George D. Foster, Beebe, White County, Ark.; Merritt H. Johnson and Daniel W. Jones, Little Rock; John Sims, Hazen; George W. Schnellbacher, Beebe. D. W. Jones has been elected President, and Mr. H. Johnson, Seeretary.

Kansas City, Memphis & Birmingham.—C. W. Chears, formerly Division Freight Agent of the Central of Georgia, at Columbus, Ga., has been appointed General Southern Agent of this road, with headquarters at Atlanta, Ga.

Knoxville, Cumberland Gap & Louisville.—W. A. Bly, formerly with the Louisville & Nashville, and later with the Louisville, Evansville & St. Louis Consolidated, at Louisville, Ky., has been appointed General Freight Agent of the Knoxville, Cumberland Gap & Louisville, vice J. B. Munson, resigned to accept service with the Richmond & Danville.

Long Beach & Alamitos Bay.—The following are the directors of the consolidated Company: E. Boughton, S. O. Houghton, T. P. Burnett, E. P. Johnson, James Campbell, A. W. Barrett and H. L. Bissell, all of Los Angeles, Cal.

Louisville & Nashville—E. E. Snider, Roadmaster of the Memphis division, has been transferred to the Nashville & Decatur division, to succeed J. L. Crain, resigned. His headquarters will be at Columbia, Tenn. A. R. Reynolds, Roadmaster of the Clarksville & Princeton division, has been transferred to the Memphis division.

John L. Logsden has been appointed Assistant Superintendent of the Nashville & Decatur and the Nashville, Florence & Sheffield divisions; W. L. Martin has been transferred from the latter division to be Assistant Superintendent on the Owensboro & Nashville.

Louisville, St. Louis & Texas.—The annual meeting was held in Louisville, Ky., last week. The election of the directors resulted as follows, being the same as last year: W. V. McCracken, J. K. McCracken, J. P. Helm, J. D. Powers, R. R. Pierce, George A. Evans and Ridgely Cayer. The officers elected were: W. V. McCracken, President, New York; George A. Evans, Vice-President, New York; G. H. Lamkin, Secretary; J. K. McCracken, Treasurer, and James P. Helm, Louisville, General Counsel.

New Westminster Southern.—The following directors were elected last week: J. J. Hill, W. P. Clough, C. X. Larrabee and H. Y. Thompson, American directors; and J. C. Brown, J. A. Forin, T. J. Trapp and Alex Ewing, of New Westminster, B. C. The directors elected the following officers: President and Managing Director, H. Y. Thompson; Vice-President, W. P. Clough; Secretary, T. J. Trapp; Treasurer, E. Sawyer.

New York, Ontario & Western.—The old directors were re-elected at the annual meeting, Sept. 30. The Board organized by re-electing the old officers as follows: Thomas P. Fowler, President; Joseph Price, Vice-President; John B. Kerr, Vice President and General Counsel; Richard D. Rickard, Secretary and Treasurer. Barrow, Wade, Guthrie & Co. were elected Auditors for the ensuing year at the stockholders' meeting, and James E. Childs was re-appointed General Manager.

Old Colony.—At the annual meeting in Boston, Sept. 29, the following directors were elected: Charles F. Choate, Frederick L. Ames, Thomas J. Borden, John S. Brayton, Thomas Dunn, George P. Gardner, James R. Kendrick, Abbot Lawrence, Charles L. Lovering, William J. Rotch, John J. Russell, Joshua M. Seers and Nathaniel Thayer. Joshua M. Sears to take the place of Royal W. Turner, deceased.

Pecos Valley.—W. H. Vaughan has been appointed Superintendent of the road, with headquarters at Pecos, Tex.

Pittsburgh, Wheeling & Kentucky.—The Board of Directors met in Pittsburgh, Pa., Sept. 25, and Hon. W. P. Hubbard was elected a director to fill the vacancy caused by the death of C. D. Hubbard. Mr. Hubbard was also elected President.

Portland & Puget Sound.—The following directors have been chosen to represent the Great Northern in the board: Sydney Dillon, J. J. Hill, W. P. Clough, E. McNeil, W. W. Cotton, C. X. Larrabee and H. Y. Thompson.

Richmond & Danville.—J. B. Munson, formerly General Freight & Passenger Agent of the Knoxville, Cumberland Gap & Louisville, has been appointed Assistant Freight Agent of the Richmond & Danville.

H. C. Ansley, of Birmingham, Ala., has been appointed Comptroller of the Central of Georgia, with office at Savannah, Ga.

Rio Grande & Gunnison.—The directors of this new company have elected the following officers: Joel F. Vaile, President; C. A. Chisholm, Secretary; J. W. Gilluly, Treasurer; E. R. Murphy, Auditor; Merritt H. Rogers, Chief Engineer; Edward O. Wolcott, General Counsel.

Seattle & Montana.—The directors and officers elected at the recent reorganization of the road are the following: J. J. Hill, W. P. Clough, E. O. Graves, D. H. Gilman and W. E. Bailey. President, J. J. Hill; Vice-President, W. P. Clough; Secretary, T. J. Milner; Treasurer, E. O. Graves.

Southern Pacific.—H. Cook, Trainmaster on the Eastern division of the Lake Erie & Western Railroad, has been appointed Division Superintendent of this road.

Susquehanna & Buffalo.—John R. T. Ryan, Garret D. Tinsman, Joseph C. Russell, David Bly, Edwin Rowley, Hiram A. Merriman and Albert D. Hermance, of Williamsport, Pa., Allen D. Russell, of Pine, Pa., and James A. Snow, of New York City, are the directors of this new company, referred to last week. John R. T. Ryan is President.

Texas Central.—The road is now operated as an independent line, Charles Hamilton being General Manager. Robert Bell has been appointed General Freight and Passenger Agent. Richard Oliver Auditor and Joseph McWilliams has been appointed Assistant Superintendent and Roadmaster of the Northeastern division with office at Ennis, Tex. The general offices are at Waco.

Texas Mexican.—W. B. Ryan has been appointed General Freight and Passenger Agent of the company, with headquarters at Laredo, Tex., vice George W. Hibbard, resigned.

Texas & Pacific.—Joseph Potton has been appointed Master Mechanic of the Rio Grande Division.

Union Pacific.—J. N. Brown, who has been Chief Clerk of the passenger department, has been appointed Acting Assistant General Manager, with office at Omaha, Neb., succeeding J. W. Scott, resigned.

Washington & Chesapeake Beach.—The incorporators of the company are: Edwin Warfield, F. H. Smith and W. C. Codd, of Baltimore; J. L. Barbour, B. F. Karns and J. G. Slater, of Washington, and Barnes Compton.

West Chester & Putnam.—The first board of directors include Thomas A. Edison, Orange, N. J.; Samuel Insull, Charles Batchelor, R. L. Cutting, W. S. Perry, S. S. Eaton, J. H. Wagstaff and Thomas Butler, New York city, and Franklin Couch, of Peekskill.

Williams Valley.—The following are the directors of this new road recently incorporated in Pennsylvania: Carroll R. Williams, President; William Elliott, Alexander S. Thompson, Harper T. Bressler, Smith Martin and Charles M. Kauffman, Tower City; Thomas Briggs, Newtown; and Aaron F. Baker, Norristown, Pa.

RAILROAD CONSTRUCTION,
Incorporations Surveys, etc.

Arizona Midland.—This company has been incorporated in Arizona by Theodore Otto, W. N. Kelly, W. B. Jones, Charles P. Gage and Charles B. Elliott, all of Prescott, Ariz. The road is to be 118 miles long from Prescott to Phenexville, to connect the Prescott & Arizona Central with the Maricopa & Prescott railroad, a feeder of the Southern Pacific. Four other companies, viz:, the Big Bug, the Turkey Creek and the Jerome & Arizona Southern have been chartered by the same incorporators as extensions of the Arizona Midland.

Arizona Roads.—Notice of the building of the following new railroads have been filed during the last few days with the state authorities at Phœnix: One from the Tiger mine to Prescott, through the Bardshaw Mountains, by Edward M. Doe & Co.; from Dead Man's Flat, in Coconino County, to Lee's Ferry, on the Colorado River, a distance of 165 miles; a third from Flagstaff to Phœnix, a distance of 215 miles. J. D. Y. Monahan will build from to Agua Fria, a distance of 60 miles. These are not all new projects, but the papers are filed to take advantage of a new law granting exemption of taxation.

Atlanta & Florida.—The directors have decided to begin work on an extension from the present southern terminus at Fort Valley, Ga. They are understood to have arranged for placing bonds for the extension. Engineers of the company have been surveying several routes during the summer, and when reports are made in a few weeks the directors will decide upon the terminus of the new line.

Bangor & Aroostook.—President Burleigh states that the financial negotiations for the construction of this line are progressing satisfactorily and he has no doubt of their final success. He recently made a tour of the line, accompanied by President Jones of the Boston & Maine, and this has given rise to rumors that the latter officer has become financially interested in the project. The surveys are progressing and a good route has been found as far as they have been run. The northern section of the line has been located too near Bridgewater Centre and preliminary lines have been run south of that point for many miles. The engineers will probably complete their present work before winter.

Big Horn Valley.—Articles of incorporation of the road have been filed in Wyoming. The capital stock is $6,000,000. The road will be built from Casper, the terminus of the Chicago & Northwestern, north to Cooke City, Mont. The incorporators are W. W. Dudley, of Richmond, Ind.; Edward W. Davidson, of Baltimore; Louis T. Michener, of Indiana; C. B. Crane and Newman F. Howe, of New York; John W. Hobart, of St. Albans, Vt.; Carroll Hobart, of Red Bank, N. J., and John J. Sinclair, of Philadelphia.

Boston & Maine.—Engineers of the company have recently made a survey between Groton and Stony Brook, for a proposed branch connecting the Worcester & Nashua division at Groton with the Stony Brook branch at Forge Village. The branch would be about five miles long, but it is not proposed at present to take further steps toward its construction.

Branchville & Bowman.—This road is being constructed between Branchville and Bowman, S. C., connecting with the South Carolina road and the Charleston, Sumter & Northern. The distance is about 12 miles, and the grading is now completed for half a mile. Samuel Dibble, of Orangeburg, S. C., is President.

Carolina Mining & Mfg. Co.—The short road between Sylva on the Western North Carolina road, and Webster, the county seat of Jackson County, North Carolina, will be completed in October. It is about four miles long and is being constructed by the Carolina Mining Mfg. and Improvement Co., as stated last week. At present about 50 men are at work on the grading, which is very light. The company has arranged for completing this four miles except laying the track. When this section is completed, the line will be extended up the Savannah Creek for six miles, and up the Tuckasegu River for twelve miles. Kaolin, copper, nickel and iron ore, together with lumber will be the principal freight over this line. W. M. Cocke, Jr., Asheville, N. C., is President. H. M. Ramseur, Webster, N. C., is Chief Engineer and Manager.

Central Arizona.—This company, through its general counsel, T. G. Morris, has filed its intention of building an extension from Wees Ferry, on the Colorado River, to Nogales, with a branch to Phœnix. Globe and Grand Cañon, a distance of 780 miles. Another will build from Phœnix no thwesterly to a junction with the Atlantic & Pacific, west of Prescott, Ariz.

Charleston, Clendennin & Sutton.—A meeting of the stockholders of the company was held at Charleston, W. Va., last week to hear the reports from the engineers of the preliminary surveys between Charleston and the Kanawha County line. Mr. C. K. McDougall, the chief engineer, made a report as to the probable cost of the line, taking either side of the Kanawha River. The stockholders' resolution instructed Mr. McDougall to proceed at once with his engineers to make a permanent survey of the line from Charleston to the Clay County line, and it is expected that this will be done before the winter weather stops work.

Chesapeake & Ohio.—President Ingalls, while in Richmond this week, said that the officers had long been considering plans for a new station at Richmond, and other improvements. "We will have to raise $1,000,000 to do the work that we have mapped out, the Belt line and the station. Engineers have been in the field all summer looking for the best route for the line around Richmond. In about a week they will be ready to report on the surveys. We will probably issue a terminal bond to the extent of $1,000,000 for this Richmond work soon." The railroad was carrying the heaviest business in its history, President Ingalls added. The earnings for August were $836,000, against $728,000 for the same period last year; net earnings for August were $251,000, against $213,000 net earnings in August of last year. The new locomotives added to the equipment are paid for out of

the earnings. The old tunnels are being arched and the expense charged to operating expenses. The road is in very good shape, and is being constantly improved, 25 locomotives being kept at work ballasting, filling ditches and in other improvements to maintenance of way.

Chicago and South Side Rapid Transit.—Legal proceedings have been begun to compel the city of Chicago to return $100,000 deposited as a guarantee to construct an elevated road for one mile within two years from March 20, 1888. For not completing a mile of the road in two years the plea advanced is that the judges of the Circuit Court refused a prompt trial of cases. The company has completed the iron structure for the mile except where right of way and injunction suits were still pending. The company says it has expended over $3,500,000.

Chicago Union Transfer Belt.—The latest belt line projected for Chicago is that of the Chicago Union Transfer Co., which proposes to build a line around the city to connect with the Stickney track, which is to be laid out for new stock yards. S. W. Allerton, who is President of the Union Transfer Co., states that he has secured the right of way through the town of Lyons. Mr. Allerton says the route starts at East Chicago on the south and runs nearly parallel with the City Belt line to a point almost on the lake shore to the north of the city. The cost of construction, it is estimated, will be $250,000.

Coos Bay, Roseburg & Eastern.—The tracklaying will be commenced at Marshfield, Or., in a few days or as soon as the rails, now on the way, have been delivered at Coos Bay. The road has been graded for about 20 miles south from Marshfield to the Coquille River and Myrtle Point. This work was completed in the spring and is now being repaired and leveled. The road has been surveyed from Myrtle Point northeast to the Union Pacific at Roseburg, but the company has not yet commenced the grading on this section.

Duluth & Winnipeg.—The track has been laid on the short branch from near White Oak Point north to Bass Brook, Minn., and the line will probably be opened for traffic in a few days. It is believed that the company will extend the line northeast about 10 miles to Lake Winnibegoshish, Minn., but at present all the work has been stopped on this line.

Elgin, Joliet & Eastern.—The short branch of this road in Aurora, Ill., referred to last week is about 1¼ miles long and has been graded, and the track practically all laid. The construction of the line involved no special features of interest except, perhaps, the interlocked crossing of the Chicago, Burlington & Quincy, where five tracks were crossed. The line was built by Kimball & McNamara, of Sioux City, Ia.

Florida, Georgia & Western.—A carload of rails for this road is expected at Tallahassee, Fla., next week, and as soon as they arrive the contractors will begin to lay the track on the line which has been graded west and south of Tallahassee, a distance of about 30 miles, to the Aucilla River. A new survey was begun last week at the Aucilla River, and is to be continued southwest toward Albion, on the Florida Central & Peninsular.

Georgia Roads.—Bills have passed the State Legislature incorporating the Smithsville & Hawkinsville, the Thomson & Lincolnton, the Wayne Southern, the Chalybeate Springs and the Tifton & Northeastern railroads. A bill has been introduced incorporating the Covington and Ocmulgee railroad, to construct a railroad from Covington to the Ocmulgee River.

Grayling, Twin Lake & Northeastern.—William Crompton, of Bay City, Mich., who was recently awarded the contract for the grading on the 27 miles of road between Grayling and Twin Lake, Mich., has begun work near Grayling and at present has about 175 men employed. The route is through a level country, and the grades and curves will be easy. R. Hanson, of Grayling, is President, and A. Torrey, of Detroit, is Chief Engineer.

Interoceanic.—This entire road from Jalapa to Vera Cruz, Mexico, will be ready for traffic early this month. Before it is opened to the public the usual special commission of engineers will be sent by the Department of Public Works to make a thorough examination of the line to determine whether the conditions of the subsidy have been complied with.

Iron Range & Huron Bay.—The tracklaying will be commenced in Marquette County, near Champion, Mich., early next week. The grading has been nearly completed between that point and Huron Bay, on Lake Superior, a distance of about 40 miles. The road connects at Champion with the Duluth, South Shore & Atlantic, the Chicago, Milwaukee & St. Paul and the Chicago & Northwestern. The grading is very heavy, and the work so far completed has been very difficult and expensive. The line crosses the Huron Mountains, and is largely heavy rock work. The maximum grade from the mines north to the lake is 43 ft. per mile.

Jacksonville Southeastern.—The grading has been begun for a branch about one mile long, which is to be built from a connection with this line at Madison to the eastern terminus of the Merchants' Bridge Terminal road. The line is being built at an expense of about $10,000, and will be used by the two companies named and the Toledo, St. Louis & Kansas City for both freight and passenger traffic. All this traffic now goes over the Eads bridge, and neither company proposes to abandon this route at present. The Toledo, St. Louis & Kansas City road will use it until its new freight house is built.

Kansas City, Arkansas & New Orleans.—New articles of incorporation were filed by this company in Arkansas last week. Of the capital stock of $6,000,000 it is reported that $1,004,000 is subscribed. The proposed road is described in the charter as to traverse the state in a southerly direction, passing through the counties of Baxter, Marion, Searcy, Stone, Van Buren, Cleburne, White, Prairie, Lonoke, Arkansas, Jefferson, Lincoln, Drew, Ashley, Bradley and Union, a distance of 300 miles.

Kewaunee, Green Bay & Western.—The contract has been let to J. A. McDougall for a branch about 18 miles long from Luxembourg northeast to Ahnapee, Wis., on Lake Michigan. Luxembourg is in Kewaunee County, about 17 miles east of Green Bay.

Kickapoo Valley & Northern.—The first rails on this new Wisconsin road were laid last week near Wauzeka. The grading has been completed for some distance north of this point to near Soldiers' Grove, and the crossties have been distributed for several miles. The contractors have completed the bridge across the Kickapoo River, and the tracklaying through the valley will probably be completed for about 25 miles to Soldiers' Grove by Nov. 15. The line is to be extended north to Wilton, on the Chicago & Northwestern, about 15 miles beyond Soldiers' Grove, but the work on this section may be delayed until next year. The equipment for the line is now being purchased in New York. Phillip Spooner is President.

Kingston, Smith's Falls & Ottawa.—The Dominion parliament has voted to this road a subsidy of $12,534 per annum for 20 years, which represents a grant in cash of $179,200, provided that upon the completion of 28 miles of road a semi-annual subsidy may be paid proportional to the value of the portion so completed in comparison with that of the whole 56 miles, the company to deposit with the minister of finance a sum not exceeding $1,170,000, in consideration whereof there shall be paid to the company for 20 years a semi-annual annuity, calculated on a basis of 3½ per cent. on the amount so deposited, the company to have the power to assign the subsidy and annuity to trustees as security for any bonds or securities which the company may issue.

Macon & Atlantic—The contractors McKee & Strong, of Macon, Ga., have employed a force of about 500 men and 175 teams during the summer on the grading east of Brewton, Ga. They have recently reduced the number to 150 men and 125 teams. They state that the work is far enough advanced to begin the tracklaying as soon as the financial condition of the railroad company warrants.

Manitoba & Northwestern.—A large party of engineers under Mr. Nelson, C. E., arrived at Prince Albert, N. W. T., last week, having completed a preliminary survey of the proposed extension of the line from Yorkton, Man., to Prince Albert. The survey of the new line connects with the present terminus of the Prince Albert branch of the Canadian Pacific.

Mexican Roads.—The Bureau of American Republics at Washington, D. C., announces that Gen. Rosendo Marquez, Governor of Puebla, Mexico, will soon visit New York City, to participate in the organization of a company for the building of a railroad from Apam to Tuxpan, Mexico.

Minneapolis, St. Paul & Sault Ste. Marie.—The track on the line northeast of Hankinson has been laid for a distance of 81 miles to Valley City, N. Dak., crossing the Northern Pacific east of Hobart, at the Sheyenne River. The line is now being operated to that point. There are 12 stations on the line, and four railroad crossings, including the Great Northern at Hankinson. The stations from Hankinson are Montador, Moselle, Sandoun, Venlo, Anselm, Sheldon Junction, Enderlin, Lucca, Fingal, Cuba, Lanona and Valley City.

On the Aberdeen line the track has been laid for 10 miles from Boynton, N. Dak., to the foot of the Coteaus, near Merricourt.

Montgomery, Hayneville & Camden.—Willis Brewer, of Hayneville, and S. C. Bloch, of Camden, directors of this company, are conducting negotiations looking toward the construction of this road, with the Alabama & Georgia Construction Co. and other contractors who have been asked to submit bids for building this line. The survey was completed last winter by C. P. Rogers from Montgomery southwest to Hayneville, about 73 miles, and the profiles and estimates made from this survey are now being examined by the contractors. The Georgia & Alabama Construction Co. is building the Savannah extension of the Savannah, Americus & Montgomery, and secured the funds for its construction, and if it undertakes to build the above road it will probably be under a similar contract.

Montreal & Western.—The company began the operation this week of regular trains as far as Ste. Adele, Que., about 20 miles north of St. Jerome. The trains are run into Montreal over the tracks of the Canadian Pacific. Ste. Adele is a few miles north of Ste. Sauveur, to which point the road has been in operation since early in the spring.

Nashville, Chattanooga & St. Louis.—The Tennessee & Coosa division is now being operated between Gadsden and Albertville, Ala., a few miles north of Attalla. The road between these points has been recently repaired and ballasted and new rails laid. The train service will soon be extended to Guntersville on the Tennessee River. The track is laid to within a few miles of the town, and this gap is to be closed at once.

New Roads.—The right of way is being obtained for a road from Paris, Tex., northeast to Hook's Ferry, on the Red River, east of the crossing of the St. Louis & San Francisco. The road will be about 30 miles long, and it is stated that the road can be built for $50,000, and of this amount half has already been subscribed.

It is reported that a scheme is on foot to organize a railroad company to build a road between Fairhaven and Sauk City, Wash., which is to be extended in time to the Sauk City mining region in the Cascade Range.

A company was organized this week at Columbus, Ind., to build a road from Columbus to Switz City, to connect with the Indiana & Illinois Southern Road. The new road will be 60 miles in length, and will, with the Indiana & Illinois Southern from a new St. Louis line.

The citizens of Victoria, Tex., and Nueces County are engaged in raising a bonus of $150,000 for the benefit of a northern syndicate, which has promised to complete a proposed road from Victoria, southwest to Sharpsburg near Corpus Christi Bay, a distance of about 70 miles, if that amount is subscribed locally.

Northern Pacific.—Contractors Griggs & Heustis are vigorously pushing the work on the extension of the Northern Pacific from Chehalis, Wash., to South Bend, on Shoalwater Bay, 60 miles. Ten miles of road has been graded westward from the latter point. Before the end of November it is expected that there will be 30 miles of track laid eastward from Chehalis, and that the gap remaining ungraded will have been reduced to 11 miles. It will be about seven months before trains will be run.

The contract for filling in beneath the trestle bridge three miles north of Black River Junction, Wash., has been awarded to John Nolan, of Tacoma. Other improvements are also to be made in the same vicinity. The contract amounts to $19,000.

Tracklaying on the Ocosta branch of the Northern Pacific has reached a point three miles from South Aberdeen, Wash. The entire line has been graded and track is being laid at the rate of two miles per day. On the western section the line is 66 miles long from the connection with the main line at Centralia, and extends westerly through Montesano to Aberdeen and Ocosta on Gray's Harbor. The track east of Montesano has been nearly all laid for some time.

Ohio Valley.—The first section of five miles of the extension from Princeton to Hopkinsville, Ky., has been let to Morgan & Co. The entire section of 30 miles between these points will probably be let this month.

Old Colony.—The directors have recently authorized the building of two additional tracks on the line between Boston and Braintree, 11 miles, which would make this division a four-track road. The engineers are now preparing plans of the work, but no date has been set for letting the contracts. Probably, however, the grading will be commenced this season.

Omaha, Kansas Central & Galveston.—J. P. Sewell & Co. are the subcontractors under Robeson & Brinkley, of Easton, Mo., for the piling and wooden bridge work on the line in Texas south to Red River and Denison.

Peninsula of Lower California.—Chief Engineer W. Z. Earle reports that the engineers working on the survey of this line in Lower California south of Yuma, Ariz., to Colnett have reached Calentura, a few miles from the Trinidad Valley where the junction is to be made with the line from San Diego and Tia Juana. After Trinidad is reached the surveyors will continue on toward Tia Juana until the engineers from the latter place are met, which will be somewhere near Santa Catarina. About half a mile of grading is being done daily between San Quintin the southern terminus and Colnett.

Philadelphia & Reading Terminal.—Work on the Philadelphia Terminal is progressing rapidly, and a large number of the iron columns and beams of the trainshed and market house at Twelfth and Arch streets has been put in place. The contract for the iron work has been awarded to A. & P. Roberts, of the Pencoyd Iron Works. It includes the iron to be used in the construction of the elevated road north of Arch street and the supports and floors of the market house and trainshed.

Pueblo & West Cliff.—Interest has been recently revived in the construction of the proposed new road between Pueblo and West Cliff, Col. J. B. Orman, Paul Wilson and A. E. Graham, of Pueblo, have been appointed a committee to secure the right of way through Pueblo and Custer counties and West Cliff. This line is to be about 75 miles long, the route being from Pueblo southwest about 25 miles to Beulah, and thence westerly to West Cliff.

Richmond & Danville.—A survey has recently been made in North Alabama for a proposed branch of the Georgia Pacific, from Hewitt or the main line to the coal mines of the Simmons Lick Coal Co.

Rio Grande & Gunnison.—Levy & Moore, Colorado contractors, have been awarded the grading on 10½ miles on this new road from Wagon Wheel Gap north to the mines at Creede, Col. The work was begun last week at the southern end of the line, and the mining company which is building the road expects to have it in operation to its mines at Creede in about six weeks.

Rio Grande Southern.—The company is preparing to open its line to Rico, Col., for freight and passenger traffic. The total length of the road from Ridgeway to Rico is 66 miles, and the portion between Ridgeway and Telluride, 45 miles, is already in operation. The new stations that will be opened are: Ophir, San Bernardo, Trout Lake, Lizard Head, Coke Ovens and Rico. The southern portion of the road, which is building from Durango northward, is being rapidly constructed, and the grading will probably be finished all the way through this fall.

St. Lawrence & Adirondack.—The Enterprise Railroad Construction Co., in which the contracting firm of McDonald, Shea & Co., and a number of Memphis capitalists are interested, has been awarded the subcontract by J. W. Westbrook, of New York, for grading 15 miles of this road, from the crossing of the Moose River, north of White Lake, easterly to the south of the river to Forge House P. O. The contract amounts to about $150,000.

St. Louis, Alton & Springfield.—The officers state that they are arranging to begin work on several extensions which have been long proposed. These include the northern extensions of the main line from Bates to Springfield, Ill., 13 miles, and a southern extension from Alton to East St. Louis. A subsidy of $60,000 was some years ago voted by Calhoun County for an extension into that county, and that line will be built as soon as bonds can be sold, and also lines to cross in Madison County and also from Alton to Highland or Collinsville.

St. Louis & Birmingham.—George R. Johnson, the contractor who is building this road through Tennessee to Florence, Ala., has a large force grading near Clifton, in Greenwood County, Tenn., on the Tennessee River. A survey has begun recently under L. S. Proctor for a line south of Clifton to Florence.

Santa Fe, Prescott & Phœnix.—A recent law of Arizona, which grants many advantages to new railroad lines in that state, has resulted in the filing of charters for thousands of miles of new road. No incorporators have been more ambitious than those of this company, who ask a charter for the following lines: 260 miles via Ashford to Phœnix; 100 from Prescott by Phœnix, through Pinal to Benson, in Cochise County; 400 miles from Phœnix to the Colorado in Yuma County; 200 miles from Ashford to Congress mine, thence to Phœnix, 260 miles, thence to Benson; 200 miles from Congress to Prescott, 60 miles; from Prescott to Phœnix, 130 miles; from Benson, through Pinal and Yuma counties, 400 miles.

Sewickley & Jeannette.—The Pittsburgh directors are negotiating for the purchase of about 600 acres of coal lands south of Sutersville, Pa., on the Baltimore & Ohio. If the purchase is effected, as is probable, the syndicate proposes to begin the construction of this line at once. It is to be built across Westmoreland County south of Pittsburgh, from the Baltimore & Ohio main line at Sewickley near the mouth of Big Sewickley Creek to Jeannette, a distance of about 15 miles. B. W. Woods, Jr., of Pittsburgh, is President.

Snohomish, Skykomish & Spokane.—This road will be extended along the water front at Everett, Wash., three miles further than was originally intended. This will make this important connecting link between the Great Northern and the Seattle, Lake Shore & Eastern 11 miles long. Contractors King & Dickinson expect to finish the work about Nov. 1.

Tamaroa & Mt. Vernon.—The right of way for this new road through Jefferson County, Ill., has been secured for 20 miles with the exception of a few small parcels. G. W. Evans, of Mt. Vernon, one of the directors, states that it is now likely that the grading will soon be let and construction commenced on the line between Mt. Vernon and Tamaroa.

Washington Southern.—The Seattle papers state that J. R. McDonald, the President of the company, has

recently returned to the city from the East, where he succeeded in disposing of $1,000,000 of the bonds of the company, which were issued to extend the logging road now in operation in Mason County, west about 40 miles to Gray's Harbor on the Pacific Coast.

Westchester & Putnam Valley.—This company has been incorporated in New York, with a capital stock of $100,000. A narrow gauge road will be constructed between mines in the town of Putnam Valley, Putnam county, and the Hudson River, in the town of Cortland, Westchester County.

West Virginia & Pittsburgh.—A local paper denies the recent report of a suspension of work by this company on the extension south of Sutton to the Gauley River. It is stated that the contractors have a large force still at work on the grading and that the company expects to continue this work through the winter. The tracklaying will be postponed until spring.

Wheeling Bridge & Terminal Co.—On Oct. 1 the company put on regular scheduled passenger trains from Martin's Ferry through Wheeling, to make regular trips hourly between the two points. The company has its passenger stations at Wheeling and Martin's Ferry completed, the Wheeling station beingarranged with the ultimate idea of having it used as a union station.

Yanceyville.—A company is being formed for the purpose of constructing a railroad from Yanceyville to the mouth of Rattle Snake Creek, near Blanche, N. C.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The plan for funding a balance of $7,000,000 guarantee fund mortgage notes is announced. These are due Nov. 1, and holders have the option of extending them at six per cent. for two years. A syndicate has been formed to take up such as the holders are not willing to extend. The amount of these notes was originally $9,000,000, but $2,000,000 has been acquired by the railroad since their issue Nov. 1, 1889. The notes are upon an underlying lien to the general mortgage four per cent. gold bond indenture of the company, dated Oct. 15, 1889, which originated with the financial reorganization of the company, under which, as well, provision was made for the retention by the Union Trust Co. of New York, as trustee, of the four per cent. bonds of an equal amount of such bonds, $9,000,000, to provide for the ultimate retirement of the guarantee fund notes. The directors of the Atchison Company have decided to defer retirement of the guarantee fund notes two years, the four per cent. bonds reserved to continue with the trustee until required for purpose of such retirement.

The Kansas Railroad Commissioners have ordered this company to repair the roadbeds of the Lawrence and Burlington branches of the Kansas Southern, south of Lawrence, Kan., and to replace the iron rails with 56-lb. steel rails. The commissioners say that the iron rails weigh only 45 and 35 lbs. to the yard, and have been in use 20 years. They criticise the condition of the roadbed, between Laurence and Ottawa and Burlington, and state that it is dangerous to operate the branches.

Canadian Railroads.—Hon. Mr. Bowell, Acting Minister of Railways and Canals, gave notice in the Dominion Parliament on Monday of a series of resolutions providing further subsidies to Canadian railroads. The subsidies, which amounted to $989 534, were as follows: To the Great Northern (Quebec), 18 miles, $28,000; Quebec & Lake St. John, for a bridge over the St. Charles, to give access to Quebec City, $5,250; Oshawa Railway & Navigation Co., 7 miles, $22,400; St. Lawrence, Lower Laurentian & Saguenay, balance of the subsidy, $92,784; Great Eastern (Quebec) balance of subsidy, $79,700; South Ontario Pacific, 49¼ miles, in lieu of subsidy granted in 1889, $158,400; Tobique Valley, 14 miles, from Perth Centre to Plaster Rock Island, 14 miles, $89,600; the Quebec Central, $288,000; and also to the Montreal & Ottawa, for 30 miles, from Vaudreuil toward Hawkesbury, the unpaid balance of subsidy voted last year, amounting to $46,040.

Canadian Pacific.—It is stated in Ottawa that the arbitrators in the Onderdonk matter will shortly make an award in favor of the company against the Dominion government for $700,000. This claim rose over the alleged failure of the government to carry out the conditions of its agreement with the Canadian Pacific to properly construct the section in the Rocky Mountains let to Andrew Onderdonk.

The company reports gross earnings for August of $1,734,985, and net earnings of $720,603. For the eight months ending Aug. 31 the gross earnings were $12,537,041, and net earnings $4,337,547, an increase of $796,234 as compared with the corresponding period last year.

Central of New Jersey.—The following report of the earnings is for August, 1891, and the eight months:

Month of August:	1891.	1890.	Inc. or dec.
Gross earnings	$1,305,042	$1,295,535	I. $9,507
Oper. expenses	744,072	707,559	I. 36.513
Net earnings	$560,970	$587,976	D. $27,006
Since Jan. 1:			
Gross earnings	$9,144,838	$8,675,314	I. $469,524
Oper. expenses	5,286,123	5,073,927	I. 212,196
Net earnings	$3,858,715	$3,601,387	I. $257,328

Chesapeake & Ohio.—The company reports gross earnings for August of $836,186, an increase of $108,145, as compared with the same month of last year, and net earnings of $251,809, an increase of $38,696.

Chicago, Burlington & Quincy.—The report of earnings for August is as follows:

	1891.	1890.	Inc. or Dec.	
Gross earnings	$3,161,839	$3,016.228	Inc.	$145,610
Operating expenses	1,817,309	1,964,764	Dec.	147,455
1-12th annual charges	800,000	773,515	Dec.	26,484
Net earnings	544,530	277,918	Inc.	266,581
Jan. 1 to Aug. 31:				
Gross earnings	20,692 921	22,674.652	Dec.	1,981.731
Operating expenses	13,200.308	15,260,928	Dec.	2,030,620
8-12 charges	6,352.000	6.188.124	Inc.	163,875
Net earnings	1,140.612	1,225,599	Dec.	84,986

Cincinnati, Jackson & Mackinaw.—The Committee of Reorganization has received all of the securities of the Cincinnati, Jackson & Mackinaw and of the Cincinnati, Van Wert & Michigan, with the exception of $40,000 par value of first mortgage bonds, and $238,000 par value income bonds of the Cincinnati, Van Wert & Michigan, and 10,800 shares of the capital stock of the company. The time for the deposit of securities with the Central Trust Company has been extended to Oct. 5. Any securities not deposited on that date will lose all right to participate in the reorganization of the company.

East Shore Terminal Co.—The recent report of a transfer of a large stock interest in this road is confirmed. G. A. Evans and N. MacDonald, of the Construction Company have sold a large amount of stock to D. H. Houghtaling, of New York, W. H. Maie, President of the Atlantic Trust Co., and Charles B. Van Nostrand, of the banking firm of S. B. Davis & Co., of New York. Mr. Houghtaling has been elected President.

Grafton & Greenbrier.—The Baltimore & Ohio has instituted preliminary action to foreclose its mortgage on this road between Grafton and Philippi, W. Va., 24 miles. The road is narrow gauge, but is being changed to standard.

Great Northwest Central.—The suit of A. Charlebois against the company has been terminated by the company agreeing that judgment should be entered for upward of $600,000, with interest, for Charlebois and those claiming under him. This sum is payable six months hence and is secured by first lien on the company's property and lands. The action taken by the company against Charlebois has been discontinued. The company is to take possession of the road meanwhile. The 50 miles completed from Brandon, Man., have never been transferred by the contractor, Charlebois, on account of the disagreement, which has only just been settled, though the road was built in 1890.

Indianapolis, Decatur & Western.—The State Court in Decatur, Ill, has handed down a decision in the suit of Allen vs. Sands, Trustee, brought for the purpose of preventing the sale of the property in Illinois, dissolving the temporary injunction granted in July last, and dismissing the case. The decision will expedite the re-organization of the company.

Kentucky & Indiana Bridge Co.—Press dispatches state that the transfer of a controlling share of the capital stock to D. J. Mackey of Evansville, Ind., was made at New Albany, Ind., this week. The bridge company transfer 51 parts of the capital stock to Mackey in consideration of a guarantee of eight per cent. on 49 per cent of the stock, he also guaranteeing the interest charges of $127,000 annually on the bonded debt of over $2,000,000. The sale includes the bridge proper, Kentucky terminals and Parkland line, New Albany Belt & Terminal and street car lines and the New Albany & Portland ferry franchise.

Macon & Birmingham.—The Metropolitan Trust & Deposit Co., Fisher & Shaw and G. Aber, all of Baltimore, have been appointed a committee by bondholders, who have deposited their bonds with the committee for the protection of their interests. Other bondholders are requested to deposit their bonds under the agreement with the committee, or with the New York Security & Trust Co., of 46 Wall street.

Maine Central.—The Knox & Lincoln road having been leased by the Maine Central will hereafter be operated by the latter corporation, and the authority of the general officers will extend over the line acquired.

May's Landing & Egg Harbor.—Vice Chancellor Green at Camden, N. J., has ordered the foreclosure of this short New Jersey road. The foreclosure was ordered in a suit begun by bondholders who have not received interest on their bonds since 1883.

Missouri Pacific.—The stock of this company has been made the object of the strongest bear attacks in Wall street the last two weeks, and its market price has declined to 60. Sept. 30. The decline was attributed to rumors that the quarterly dividend would not be declared. At a meeting of the directors Sept. 30, the dividend was passed. The following financial exhibit of the nine months of the year was submitted:

Gross earnings		$9,472,021
Operating expenses		7,188,280
Surplus		$2,273,741
Dividends, rentals and other receipts		397,730
Total		$2,671,471
Payment interest	$2,088,867	
Taxes	353,063	
Rentals	104,762	
Sundry amounts	56,062	
Refunding 2d mtge. bonds	128,650	
		2,731,404
Deficit		$59,933

Jay Gould, in his report accompanying this statement, said: The Auditor has charged against net earnings for this period the expenses of refunding $7,000,000 of Cairo & Fulton 7 per cent. bonds (which fell due on Jan. 1) into the new general mortgage 5 per cent. bonds, amounting to $661,370; also a similar charge for extending $2,573,000 Missouri Pacific 7 per cent. bonds (due July 1) to 5 per cent., amounting to $128,650, a total of $790,020. While this operation results in an aggregate saving of $192,000 in the future annual fixed charges, the mortgages required the exchange of bond for bond, thus leaving this expense a charge to be paid out of current earnings. The almost total failure of crops in Kansas and Nebraska last year, coupled with the low rates for carrying the same, is the cause of the temporarily poor showing. The present floating debt of the company is $4,481,347, and would have to be increased if a dividend were declared; to liquidate the same, wherever satisfactory prices can be obtained, the company has available current securities, as follows: $1,000,000 Iron Mountain five per cent. bonds, $3,000,000 Missouri Pacific first collateral Trust five per cent bonds, $5,000,000 Wabash Debenture B bonds; total, $9,500,000. During the last 11 years, said Mr. Gould, the company paid $22,555,303 in dividends, and expended in betterments and charged directly to operating expenses the sum of $4,028,747.

New York Central & Hudson River.—The following table gives the estimated earnings of the system for the three months ending Sept. 30, 1891, compared with actual earnings for the corresponding period of 1890; the operations of the Rome, Watertown & Ogdensburg being included in the former year, but not in 1890 report:

	1891.	1890.	Increase.
Gross earnings	$11,909,932	$9,061,235	$2,845.697
Oper. expenses	7,647.416	6,237,523	1,409,893
Net earnings	$4,262,516	$2,826,712	$1,435,804
Fixed charges	2,466,620	2,082,000	384,620
Profit	$1,795,896	$744,712	$1,051,184
Dividend	894,283	894,283	.....
Surplus	$901,613	def. $149,570	$1,051,184

New York, Lake Erie & Western.—The following table shows the earnings of the company for August, 1891, and the eleven months, Oct. 1 to Aug. 31, compared with the corresponding periods of the last fiscal year:

Month of August:	1891.	1890.	Increase.
Gross earnings	$2,946,268	$2 798,618	$147,650
Oper. expenses	1,823,924	1,703,384	120,540
	$1,122,344	$1,095,234	$27,110
Less proportions due leased lines	266,551	254,384	12,167
Net earnings	$855,793	$840,850	$14,943
Oct. 1 to Aug. 31:			
Gross earnings	$27,155,382	$26,499,152	$656,230
Oper. expenses	17,736,312	17,284,567	451,745
	$9,419,070	$9,214,585	$204,485
Less proportions due leased lines	2,388,789	2,372,189	16,600
Net earnings	$7,030,281	$6,842,396	$187,885

New York, Ontario & Western.—The annual report of the President of the company states that the gross earnings for the year ending June 30, 1891, were $2,809,702.16, an increase of $603,256, or 27.69 per cent. Rentals and fixed charges for the year were $553,890.63, leaving a surplus of $100,439.32. The number of passengers carried was 1,008,215, an increase of 21.79 per cent., and the number of tons of freight carried was 1,737,059, an increase of 38.17 per cent. The gross earnings per mile operated were $6,631 as compared with $5,930 in the previous year. The expenses per mile operated were $4,851, compared with $4,539 in the previous year—an increase of 6.87 per cent. The net earnings per mile operated were $1,779, as compared with $1,390 during the previous year. The earnings of the property, particularly on the Scranton Branch, show a steady increase, the coal shipments on the latter, during July, August and September, 1891 (latter partly estimated), being 63,960.02, 60.829.11 and 70 000 tons respectively, against 22,954.13, 29,905.03 and 39,317.04 tons for the corresponding months of 1890. General Manager Childs in his report says: The volume of tonnage as well as revenue is steadily increasing (increase in tons hauled one mile over previous year is 70 per cent.), and as our through freight represents but 9 per cent., and our through passenger business only 4.4 per cent. of the gross earnings, the balance being derived from business which is purely local in character, it is in no danger of being seriously affected by through freight and passenger wars which have been so disastrous to American roads.

Northern Pacific.—The statement of earnings for July shows the following figures:

	1891.	1890.	Inc. or dec.
Gross earn	$2,441 554	$2,499,045	D. $57.491
Oper. expen	1,478,747	1,521,296	D. 42,549
Net earn	$962,807	$977.749	D. $14.943
Other income	110,319	21,392	I. 88.927
Total net	$1,073,126	$999,142	I. $73.984
Int., rentals, &c	1,050,724	974,003	I. 76,721
Surplus	$22,402	$25,138	D. $2,736

The preferred stock outstanding is $36,625,612, and the amount of consolidated bonds outstanding is $38,553,000.

Old Colony.—The stockholders in annual meeting this week have voted to authorize the directors to incorporate the New York, Providence & Boston and Old Colony Terminal Co., with $500,000 capital, to build a union station at Providence. It was also voted to authorize the directors to aid in the construction of the Plymouth & Middleborough.

Oregon Pacific.—A suit has been commenced in the State Circuit Court, at Salem, Or., the by District Attorney of Linn County against the railroad company, to have the company's charter annulled. It is alleged that the company has violated the provisions of its charter by refusing to pay its employés.

Pennsylvania.—The statement of the business of all lines of the company is as follows: All lines east of Pittsburgh and Erie, for August, 1891, as compared with the same month in 1890, show an increase in gross earnings of $281,520, an increase in expenses of $122,136, an increase in net earnings of $159,384. The eight months of 1891, as compared with the same period in 1890, show an increase in gross earnings of $103,736, a decrease in expenses of $507,201, an increase in net earnings of $610,937. All lines west of Pittsburgh and Erie, for August, 1891, as compared with the same month in 1890, show a decrease in gross earnings of $109,416, a decrease in expenses of $20,466, a decrease in net earnings of $88,950. The eight months of 1891, as compared with the same period of 1890, show a decrease in gross earnings of $1,216,816, a decrease in expenses of $1,469,167, and an increase in net earnings of $252,351.

Philadelphia & Reading.—The statement of the business of the railroad for August, 1891, compared with the same month of 1890, is as follows:

Month of August:	1891.	1890.	Inc. or dec
Gross earnings	$1,963,775	$1,824.705	I. $139,070
Operating expenses	956,657	879,283	I. 77,374
Profit in operating	$1,007,118	$945,422	I. $61,696
Other receipts	7,504	31,519	D. 24,015
Profit for month	$1,014,622	$976,941	I. $37,681
Expen. for permanent imp.	55,471	21,663	I. 33,808
One-twelfth of year's fixed charges	620,749	598,505	I. 22.244
	676,220	620,168	I. 56,052
Surplus	$338,401	$356,773	D. $18,372
Year to Aug. 31:			
Gross earnings	$15,531,565	$14,982,158	I. $549,407
Operating expenses	8,599,220	8,608,629	D. 9,409
Profit in operating	$6,932,345	$6,373,529	I. $558,816
Other receipts	327,778	398,126	D. 70,348
Profit for month	$7,230,123	$6,771,655	I. $488,468
Expen. for permanent imp.	369,761	486,980	D. 117,219
One-twelfth of year's fixed charges	5,557,294	5,386,542	I. 170,752
	5,927,055	5,873,522	I. 53,533
Surplus	$1,333,068	$898,133	I. $434,935

The Coal & Iron Co. shows gross receipts for August, 1891, of $1,947,729, an increase of $199,882. The profit from mining was $82,707, an increase of $71,801; fixed charges were $68,000, and the surplus $14,707, which is an increase of $72,312. The gross earnings for the eight months, Jan. 1 to Aug. 31, were $13,870,389, an increase of $1,159,103; loss from mining, $114,876, against a deficit of $337,396 for the corresponding period of 1890; fixed charges, $612,000, and the deficit $726,876 against a deficit for last year of $953,991.

Southern Pacific.—A bill in equity was filed at the United States Court in Los Angeles, Cal., this week, against the railroad and others to quit the title and for-

feit to the government of 850,000 acres of land in Los Angeles, San Bernardino and Ventura counties, Cal. The land is an overlapping grant made to the Atlantic & Pacific Company.

St. Louis, Iron Mountain & Southern.—The following is a report for the nine months of the year, September estimated:

Gross earnings		$8,017,311
Operating expenses		5,760,921
Surplus		$2,256,390
Dividends received	$3,066	
Sundry amounts	39,102	
		$242,168
Total		$2,298,558
Interest payments	$1,688,729	
Taxes	227,139	
Rentals	282,208	
Sundry amounts	99,700	
Refunding C. & F. bonds	661,570	
		2,969,237
Deficit		$670,679
Net deficit before payment of dividends		670,679
Dividends paid		948,595
		$1,619,275

Texas Central.—The Receivers, B. G. Clark and Charles Dillingham, have given notice that by order of the United States Circuit Court for the northern district of Texas, they, on Sept. 24, delivered to the purchasing trustees, Charles Moran, Cornelius B. Gould and Henry K. McHarg, the road extending from Ross to Albany and from Garrett to Roberts, with all its rolling stock and other property as is provided for in the order of court of Aug. 28.

Texas Trunk.—Charles Dillingham, of Houston, the Receiver appointed by the United States Courts has secured possession of this road, and the running of trains was resumed Sept. 25. Trains have not been running since the beginning of the Receivership difficulty. The employés have not been paid for several months. The suits under which the Sheriff assumed possession and Receiver Mooney was appointed, have been settled and taken out of court.

Union Pacific.—The creditors' committee has declared operative the plan for extending the floating debt of the company, by issuing three-years notes secured by deposit as collateral of all the stock and bonds of proprietary and leased lines held by the Union Pacific. The committee asked for public subscriptions of $5,500,000 of the notes at 92½. Jay Gould has subscribed for $1,000,000 of the notes. Members of the creditors committee state that the total issue of the notes, including the $5,500,000 subscribed for and the amount extended, will be about $19,000,000, leaving about $6,000,000 available for future needs of the company. None of these notes, however, can be issued without the permission of the committee, and the company cannot increase its debt without first obtaining the approval of the committee.

Wheeling Bridge & Terminal Co.—At the time this company was chartered the county of Ohio, West Virginia, in which the City of Wheeling is located, subscribed $300,000 to the company, $200,000 of it to be paid as the work on the line progressed far enough to warrant the assurance that the original plans would be completed, and the last $100,000 when there should be a new road from Bowerston, Ohio, to the western end of the Terminal Company's bridge at Martin's Ferry, Ohio. The contract between the county and the railroad did not specify the building of a new road by the Terminal nompany, the wording being that "a new railroad" should be built. About four weeks ago the Terminal Company made application to the Board of County Commissioners for the last $100,000, the other sums having been paid to the company. The grounds for the demand was that the Wheeling & Lake Erie had built a new line from Bowerston, Ohio, to the bridge of the Terminal Company. There was a long discussion as to the propriety of paying the money, and last Thursday the County Commissioners ended the matter by ordering the payment of the $100,000 to the company. The line of the Wheeling & Lake Erie between Bowerstown and Martin's Ferry was not built under any agreement with the Terminal Company, but as an extension of its main line. It is understood that part of the opposition to the payment of the $100,000 was made by the Wheeling & Lake Erie on the ground that the Terminal Company had no financial or other responsibility or interest in the new line, and, therefore, it had no claim on the funds it asked, as the entire cost of building the new line was borne by the Wheeling & Lake Erie.

TRAFFIC.

Traffic Notes.

Both the Providence Line and the Stonington Line steamers have reduced passenger rates to the basis of $3 New York to Boston.

Railroad Commissioner Hamill, of Colorado, has asserted his authority, which, says the *Denver Republican*, "has hitherto been latent," by calling on a number of railroads for copies of their traffic agreements with other roads.

It has been reported from Chicago that circulars emanating from the Wabash road have been issued promising ticket agents commissions on tickets sold over the "Niagara Falls Short Line" of that company since January last, but officers of the company disavow responsibility for any such circular.

The Gulf, Colorado & Santa Fe prints on its freight tariffs the following:

"This tariff is made up under the mandate of the Railroad Commission of Texas, and issued by the Gulf, Colorado & Santa Fe Railway Company under protest, all legal rights to contest same in the courts being reserved."

It appears that the Lake Shore & Michigan Southern has discharged a number of ticket agents, including one or two prominent ones, and there is little doubt that the action is based on well founded reports that the men accepted ticket commissions from foreign roads, but the Trunk Line board of rulings had no official connection with the action of the Lake Shore, as reported in the daily newspapers.

A meeting of general passenger agents at Cincinnati last week adjusted rates to the Pacific coast. They will be based on a fare of $15 from Cincinnati to Kansas City, and beyond that they will follow transcontinental rates. This will make rates from Cincinnati to Pacific points about $2.50 more than from Chicago. At the same meeting the round-trip rate to Jacksonville, Fla., was fixed at $34 from Cincinnati, $32 from Louisville, $30 from St. Louis, $45 from Chicago, and $38 from Indianapolis.

The Texas Railroad Commissioners have issued a new cotton tariff, canceling that which went into effect Sept. 14. The change is made with the aim of stopping the practice of the roads in refusing to compress cotton. It fixes the rate on compressed cotton at a figure 10 cents per 100 lbs. less than that on flat cotton. The minimum rate on compressed cotton is 10 cents for a 10-mile haul, the maximum rate is 55 cents. Under the canceled tariff it was the same as that in flat cotton, to-wit, 65 cents. Where the shipper and road agree to do so, cotton may be stopped in transit and compressed, 10 cents per 100 lbs. being allowed for compressing. In other respects the regulations are not materially changed. This tariff becomes effective Oct. 12.

In consequence of misunderstandings, the Texas Railroad Commissioners have issued an amendment to their commodity tariff No. 1, making a change in the regulation touching joint rates over two or more roads. The rule is as follows:

To make a rate on a road not taking 10 per cent. increase, to a point on a road authorized to add 10 per cent. to the tariff. First obtain the local of each road. (The local of the road authorized to add 10 per cent. to the tariff, is the rate for the mileage freight is carried over such road, plus 10 per cent.) Deduct 20 per cent. of the sum of the two locals, and this will give the rate to be applied.

Examples: Take two roads, one of which is entitled to add 10 per cent., with a haul of 50 miles each; the local of the 10 per cent. road is eight cents plus 10 per cent., equal to 8.8 cents. The local of the other road is eight cents, the sum of the two locals is 16.8 cents; deduct 20 per cent. and the result shows the correct through rate, which is 13.5 cents.

Drop all fractions less than one-tenth in computing rates under commodity tariff No. 1.

Chicago Traffic Matters.

CHICAGO, Sept. 30, 1891.

Rumors are current of trouble in the Central Traffic Association over charges said to have been preferred against the Big Four for paying commissions in proscribed territory; but the officers of that road claim that they have not been doing so, and no reliable information can be had as to whether charges have actually been preferred or not.

The I. I. I. matter has been adjusted, temporarily at least, as will be seen by the following circular from the Joint Committee:

In accordance with the resolutions adopted by the General Managers of the lines in the Trunk Line, Central Traffic and Western Freight Associations, authorizing the Joint Rate Committee to fix divisions of through rates between eastern and western lines through junctions east of the Mississippi River, the following divisions will become effective on October 5, in both directions:

On traffic from or to Mississippi River points, East St. Louis to and including East Dubuque, Ill., which originates at or is destined to points west of that river and takes the 116 per cent. basis, the following percentages will govern:

TO AND FROM	Allowances via Streator and Dwight; per cents. West of Streator or Dwight to and from Mississippi River points.	Between Streator or Dwight and Eastern Junctions with I. & I. R. R.	East of Eastern Line Junctions with I. & I.
Boston	13½	13½	73
New York, Philadelphia, Baltimore and Albany	14	14	72
Syracuse	18	18	64
Buffalo, Pittsburgh and other Western Termini of Trunk Lines	20	20	60

For Mississippi River points proper and places in Illinois taking rates based on Chicago-New York rates, the divisions will be those shown in Circular No. 40 via Dwight and Streator, and the allowances to the I. I. & I. will be the following percentages of the proportions of through rates accruing east of the junctions of that road with western lines: To and from points east of the Western Termini of Trunk Lines, 10 per cent.; to and from Buffalo, Pittsburgh and other Western Termini of Trunk Lines, 15 per cent. These divisions apply where Chicago rates have been authorized to and from Streator for purposes of equalization. Divisions for I. I. & I. local traffic are also given.

The Commissioners of the Western Traffic Association issue a decision approving this circular and ordering it enforced.

What may yet prove to be a matter of considerable magnitude has arisen over the action of the Great Northern in regard to rates on wheat from the Dakotas to Duluth and Minneapolis. The Great Northern and Northern Pacific have for some time made a rate to Duluth the same as Minneapolis. The Chicago, Milwaukee & St. Paul and Chicago & Northwestern found that they were losing business and decided that they would have to meet the rate. As their lines run via Minneapolis, the Minneapolis grain men were at once stirred up and protested. A conference was held last week and the Great Northern was asked to raise the Duluth rate, but refused, and proposed reducing the Minneapolis rate. This was strongly objected to by the other northwestern lines on the ground that it would bring about a demoralization of all the northwestern rates, as Milwaukee and Chicago are based on Minneapolis. The outcome of the meeting was the announcement by the Great Northern that it proposed to reduce the Minneapolis rate, whether or no.

Columbian Passenger Committee.

At the call of Mr. E. A. Ford, of the Pennsylvania lines west of Pittsburgh, a meeting of the general passenger agents of all the roads terminating in Chicago was held in that city Sept. 30 to discuss rates and arrangements for the World's Fair. An agreement was effected for the organization of a body to be known as the Columbian Passenger Committee. A committee composed of James Charlton, of the Chicago & Alton; O. W. Ruggles, of the Michigan Central, and A. H. Hanson, of the Illinois Central, was appointed to perfect the plan of organization, and W. R. Busenbark, John Sebastian, George H. Heafford, James Barker and W. E. Davis were constituted a committee to confer with the World's Fair managers with a view to securing a site and building on the Exposition grounds for use as a joint ticket office and bureau of information. The Secretary was instructed to call a meeting of general baggage agents for Oct. 13, to discuss the question of handling baggage during the fair.

The Eau Claire Lumber Case.

The petition of the Eau Claire, (Wis.) Board of Trade vs. the Chicago, Milwaukee & St. Paul, in which a large amount of testimony has been taken this summer by affidavits, has just been heard by Interstate Commerce Commissioners Morrison, Veazy and Knapp at Chicago. The case is one of more than passing importance as it affects directly and indirectly the entire lumber interest of the Mississippi Valley and the lumber rates of the roads operating in that territory.

The question involves what is known as the Bogue system of differentials, although the specific question before the Commission is as to the rates to be charged from Eau Claire as against other lumber shipping points. The Eau Claire Board of Trade seeks to have the differential against Eau Claire reduced, on the ground that it is practically prohibitory and especially so as compared with rates from La Crosse and Winona. The defense maintains that the present rates afford only a fair return upon the railroad investment and that changing the rate at Eau Claire would result in similar changes at other points with the only result that the railroads would lose a large amount of revenue and Eau Claire would be placed in exactly the same position as under the present rates. The intervenors, the Middle Mississippi lumbermen, set up the additional defense that the Commission has no jurisdiction in the premises. During the proceedings the Atchison and Burlington roads asked and obtained leave to file briefs, on the ground that they were not interested when the case was commenced, but, owing to the increase of their lumber business since then, were now interested parties.

Counsel for the Board of Trade stated that upon the completion of the Chippewa Valley division of the Chicago, Milwaukee & St. Paul, in 1881, a rate of 2 cents above the Chicago rate was made on lumber to the Missouri River points, which induced the manufacturers at Eau Claire and vicinity to enlarge their business. When the Bogue award of a differential of 6¼ cents went into effect the business was paralyzed. That the rates at Eau Claire are naturally too high is shown, they argued, by statistics proving that while the lumber business has grown at all other points since 1883, it has declined at Eau Claire.

Counsel for the intervenors argued that the Commissioners had no jurisdiction; that they could not prescribe a system of differentials for more than one road; that if they cannot fix rates between shipping points and destination for the entire traffic the interest of towns between Clinton and St. Louis could not be protected; that the enforcing of a system of differentials takes away the right of a carrier to fix its own rates; that all points are not common to all the roads, and that these proceedings could only be against the roads touching Eau Claire, and therefore the Commission had no jurisdiction as to points along the river where the Chicago, Milwaukee & St. Paul and Chicago, St. Paul, Minneapolis & Omaha did not touch. The Bogue system was the outcome of protracted conflict; was made by men of experience, and had given peace for the first time in the history of the business. The complaint of Eau Claire that the award had injured her business was unwarranted; during the time the two cent differential was in effect she enjoyed a forced and unnatural prosperity. To grant the demand of Eau Claire would drive all the towns along the river out of the lumber business.

Counsel for the Chicago, St. Paul, Minneapolis & Omaha said there was no discrimination on that line. A reduction of 2 cents per 100 lbs. would reduce the earnings of that company more than $175,000 per year. If the Bogue differential had been the principal cause of a decline at Eau Claire and another rate will restore it, it will be equally desirable for other points as much entitled to the protection of the general laws as Eau Claire. In his opinion the greatest factor in producing the changes claimed at Eau Claire has been the rapid growth of large towns in all the states of the northwest, and the enormous increase in the manufacturing interests of those towns.

Mr. H. H. Hayden made the closing argument for the petitioners. He claimed that the Omaha road had been largely paid for from the proceeds of its enormous land and timber grant, which had the result of reducing the actual invested capital very much below the figures submitted, on which a reasonable return was argued. The Omaha road was owned by the Northwestern, which is carrying lumber in Iowa at much less rates than those charged in Wisconsin.

The hearing was then concluded. It will be several months before a decision can be reached, as each side has opportunity to file briefs and replies.

Eastbound Shipments.

The shipments of eastbound freight, not including live stock, from Chicago by all the lines for the week ending Sept. 26 amounted to 57,928 tons, against 57,894 tons during the preceding week, an increase of 34 tons, and against 72,584 tons during the corresponding week of 1890, a decrease of 14,656 tons. The proportions carried by each road were:

	Wk. to Sept. 26.		Wk. to Sept. 19.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	8,514	14.7	9,247	16
Wabash	3,934	6.8	4,161	7.2
Lake Shore & Michigan South.	9,221	15.9	8,847	15.3
Pitts., Ft. Wayne & Chicago	6,131	10.6	5,858	10.1
Pitts., Cin., Chicago & St. L	8,434	14.6	7,639	13.2
Baltimore & Ohio	4,321	7.4	3,229	5.6
Chicago & Grand Trunk	4,251	7.3	4,666	8.0
New York, Chic. & St. Louis	5,897	10.2	6,755	11.7
Chicago & Erie	7,225	12.5	7,492	12.9
Total	57,928	100.0	57,894	100.0

Of the above shipments 2,477 tons were flour, 24,105 tons grain, 2,213 tons millstuff, 3,854 tons cured meats, 8,096 tons dressed beef, 1,303 tons butter, 1,319 tons hides and 5,898 tons lumber. The three Vanderbilt lines carried 40.8 per cent. and the two Pennsylvania lines 25.2 per cent. The lake lines carried 153,047 tons, against 115,174 tons during the preceding week, an increase of 37,873 tons.